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# Supreme Court of the United States

OCTOBER TERM, 1930

**No. 12, Original**

THE STATE OF CONNECTICUT, COMPLAINANT
*v.*
THE COMMONWEALTH OF MASSACHUSETTS,
DEFENDANT

## IN EQUITY

## MOTION FOR LEAVE TO FILE — COMPLAINANT'S EXCEPTIONS TO THE REPORT OF THE SPECIAL MASTER.

BENJAMIN W. ALLING,
*Attorney General of the State of Connecticut.*

ERNEST W. AVERILL,
*Deputy Attorney General of the State of Connecticut.*

BENEDICT M. HOLDEN,
*Special Counsel.*

THE CASE, LOCKWOOD & BRAINARD CO.
HARTFORD, CONN.

# In the
# Supreme Court of the United States

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THE STATE OF CONNECTICUT, COMPLAINANT

*v.*

THE COMMONWEALTH OF MASSACHUSETTS

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**MOTION FOR LEAVE TO FILE — COMPLAINANT'S EXCEPTIONS TO THE REPORT OF THE SPECIAL MASTER.**

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The State of Connecticut, by its attorney-general, appearing in that behalf by and with the authority, consent and direction of the governor of said state, comes now here and presents this its motion for leave to file in this court its exceptions to the report of the Special Master, and further requests that said exceptions be argued orally and a time fixed for

such purpose. A true copy of said exceptions is hereto attached.

STATE OF CONNECTICUT,
By BENJAMIN W. ALLING,
*Its Attorney-General.*

ERNEST L. AVERILL,
*Deputy Attorney-General.*
BENEDICT M. HOLDEN,
*Special Counsel.*

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**Original No. 12.**

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STATE OF CONNECTICUT

*v.*

COMMONWEALTH OF MASSACHUSETTS

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## IN EQUITY

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COMPLAINANT'S EXCEPTIONS TO THE REPORT OF THE SPECIAL MASTER

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Now comes the State of Connecticut, complainant in the above entitled cause, and excepts to the report filed by Charles W. Bunn, Special Master, and for causes of exception shows the following:

For the convenience of the Court, counsel for the complainant have arranged the exceptions under such headings

as they feel embrace the questions of fact and law involved, to wit:

The Massachusetts Project,
Effect on Navigation,
Effect on Power Capacity,
Effect on Agriculture,
Effect on Pollution,
Effect on Fish Life,
Available Supplies in Eastern Massachusetts,
The Question of Necessity.

## THE MASSACHUSETTS PROJECT

## EXCEPTIONS AS TO FACTS

Exception First: The complainant excepts to the report of the Special Master as contained on page three of the finding, as follows:

> "The plan of these laws was diversion into Wachusett reservoir (the principal present supply of Boston), of (a) flood waters of the Ware River (act of '26), and (b) certain waters of the Swift river (act of '27) . . . . "

because such finding and designation is contrary to all the evidence in the case and there is no evidence to support the claim that the water to be taken is "flood waters"; and the Special Master should have found and the Court is asked to find that on the Swift river practically one hundred percent of the flow is to be diverted at all times under the Massachusetts legislation, and approximately sixty-nine percent of the flow under the restrictions of the War Department.

**Exhibit C-25B.**

On the Ware river "flood waters" is defined as "all the waters in excess of a flow of eighty five million gallons per day." This is not flood water but is approximately an average flow which is not exceeded except on 138 days a year.

Exhibit C-13A.

The diversion is not flood waters or excess waters but even during the times of highest flow is from seventy five per cent to ninety per cent of the total flow.

Exhibit C-7A.
Jacobs, R. 275.

Exception Second: The complainant excepts to the failure of the master to find in accordance with the request of the complainant,

> "that the amount of water to be taken from the Ware and Swift Rivers is ascertainable and measurable and is stated by the Chief Engineer of the Metropolitan District Water Supply Commission to be 2% of the average normal flow of the Connecticut River."

Exception Third: The complainant excepts to that portion of finding of the Special Master appearing on page nineteen as follows:

> "The maximum diversions are at high water and amount to from 5 to 6 inches, that is at periods of very high water the stage of the Connecticut may be reduced 5 to 6 inches, at medium stages less, and at very low stages its flow is increased".

and to the failure of the Special Master to find as follows,

> "The quantity of water diverted will vary during the year, effecting a reduction in river stage of approxi-

mately 3 inches or less during low flows and as much as six and a half inches at high flows."

Exhibit C-25A.
Exhibit C-25B.
Exhibit C-41.

Actual diversions will take place even when the gauge is as low as zero effecting a reduction of as much as 3 inches at that time (Exhibit C-41) and even when the gauge is below the critical point of two feet, diversion will take place approximately one half of the time as will appear later. The diversion of water when the gauge is low will affect the capacity of the river for navigation, fishing, and power development while the taking of quantities of water during high stages of the river will injure the fertilizing effect of the flood waters; and during the month of May, when shad are coming up the river, a diversion of flood waters will materially injure fishing. The diversion of water will have an effect on the pollution in the river.

Winsor, R. 137; 650, 651.
Jacobs, R. 272.
Burgie, R. 928-943.

Exception Fourth: The complainant excepts to the failure of the master to find, as requested by the complainant, that over one-half the time when the gauge at Hartford is 2.0 feet or less the natural flow of the Swift River is in excess of 110 cubic feet per second and Massachusetts would be taking water from the river. It is evident that when the Hartford gauge is at the critically low point of 2.0 feet or less Massachusetts is further depleting the supply of water in the river and the suggestions of the War Department would not prevent the taking which will work a mate-

rial reduction below the 2.1 feet on the gauge, and below the point where the water is critically needed.

Exhibit C-41.
Exhibit D-36.

Exception Fifth: The complainant excepts to the report of the special master because of his failure to find as follows:—The Commonwealth of Massachusetts plans to take a supply of water from the Ware and Swift rivers, the waters of which flow into and help maintain the flow of the Connecticut River, and for that purpose has already expended large sums of money in constructing dams, conduits, aqueducts and tunnels and plans to construct a large storage reservoir. The plan provides for tunnels and storage reservoirs and the capacity of each of the two tunnels from the Ware river is in excess of 900,000,000 gallons per day and the plans include the construction of a storage reservoir to store 300,000,000,000 to 400,000,000,000 gallons and to flood between twenty-five and thirty square miles of territory, sixty percent of which territory has already been acquired and tunnels and reservoirs are to be built to take care of an additional supply to be taken from waters in the Connecticut River watershed, including the Millers, Quaboag, Westfield and Deerfield Rivers.

Smith, J. W., R. 2177, 2179, 2181.
Whitman, R. 351, 358.
Winsor, R. 687, 688, 690.

The usefulness of this construction is limited strictly to the carrying and storage of water taken from the Connecticut Valley, and substantially all the expenditures have been made, plans perfected, and work performed since the commencement of this action.

Winsor, R. 60, 65, 92, 93, 131, 202, 203.
Smith, R. 2179, 2181.
Whitman, R. 344, 345, 348, 358.

And this additional supply is intended for the use of the Metropolitan district and other communities which now or hereafter may require water therefrom, and the city of Worcester.

Reprint of Answer, Appendix A, P. 36.

Exception Sixth: The complainant excepts to that portion of the master's finding set forth on page five of the General Facts which states:—

> "Diversions of the Ware and Swift as permitted by the Secretary of War will furnish about 191,000,000 gallons of water per day. The Massachusetts acts do not authorize diversion of any waters other than the Ware and Swift, and as to these the record shows that (as far as counsel can commit it) Massachusetts proposes to abide by the Secretary of War's requirements and restrictions touching the diversions."

insofar as the master failed to find, in addition to the facts found, the following: That, if Massachusetts proposes to abide by the recommendations of the Secretary of War an injunction should issue from this court forbidding it to go beyond the limitations prescribed and set forth in said recommendations. The estimated quantity which will be taken from the Ware and Swift rivers under the advice of the War Department and in accordance with the present plans of the Commonwealth of Massachusetts to accept and abide by the advice of the War Department in the premises, will be 191,000,000 gallons per day. The tunnels nad reservoirs have a capacity to carry and store a much greater volume of water, and have been planned to carry additional water from this source of supply. When planned, a further taking of Connecticut river water was contemplated; and these plans have never been changed or modified to the slightest extent. The

Massachusetts acts authorize diversion of waters other than those of the Ware and Swift rivers and permit a general taking of the water of the Connecticut River tributaries except the Millers River.

Winsor, R. 686, 687, 688, 690.
Smith, J. W., R. 2177, 2179, 2181.
Goodnough, R. 1638.
Whitman, R. 351-358.
Exhibit C-1 and C-2.

Exception Seventh: The complainant excepts to that portion of the finding of the Special Master set forth on page fifty three, which states:

> "Massachusetts says she intends to divert no more water than the Secretary of War permits and in every way to follow the conditions he imposes. It is true that counsel in this case cannot control the future action of Massachusetts."

because there is not a scintilla of evidence in the record that Massachusetts has ever said she intends to divert no more water than the Secretary of War permits or to follow the conditions imposed, except by an answer of counsel to a question asked by the Special Master; and the Special Master should have found that the advice and recommendations of the War Department were received by the Metropolitan District Water Supply Commission on or about May 17th, 1929, that this Commission has never reported any plans to modify the original plans adopted under the Legislation of the Great and General Court of the Commonwealth of Massachusetts, although it has been in session since such advice and suggestions have been received; and there has been no action taken or votes passed by the Great and General Court of the Commonwealth of Massachusetts. The plans made and the construction contemplated under the authority of the legislative acts have not been changed, and when this construction

was planned a further taking of the Connecticut river was contemplated.

Winsor, R. 686-688, 690.

## EXCEPTIONS AS TO THE LAW

Exception Eighth: The complainant excepts to the portion of the findings of the master as set forth on page fifty-three which states:

> "The judgment in this case, if it goes in favor of Massachusetts, should settle her right to take only so much water and in such manner and at such times as the Secretary of War permits. It will in no way bar or diminish the right of Connecticut to proceed against the taking of additional future water."

insofar as the Special Master has failed to recommend in addition that Massachusetts should be prohibited and enjoined from taking water beyond certain quantities, and that litigation having been brought to court and heard extensively should settle the controversy between the States; and that this finding is inconsistent with the recommendation that the bill be dismissed.

Exception Ninth:

The Special Master erred and mistook the law in overruling the complainant's claim that any invasion of the rights or privileges of a sovereign state calls for injunction, and does not require specific proof of the actual amount of money damages which might be suffered by reason of such invasion.

Exception Tenth: The Special Master erred and mistook the law in overruling the complainant's claim that the Supreme Court of the United States in a suit between two

states will apply the law of the states rather than a rule of its own.

Exception Eleventh: The Special Master erred and mistook the law in overruling the complainant's claim that where both states have adopted the common law rule of riparian rights, the Supreme Court of the United States has no function but to apply the rule of the common law in force in both States in the determination of a controversy similar to the case at bar.

Exception Twelfth: The Special Master erred and mistook the law in holding and reporting that in a controversy between States, where it is possible to measure the damages inflicted upon the rights existing in one state, the remedy is one at law.

Exception Thirteenth: The Special Master erred and mistook the law in holding that the Supreme Court of the United States can ignore the riparian doctrine as to water rights as applied by the two States which are the only parties to the action before the Court and impose upon them, or one of them, the doctrine of prior appropriation or any other doctrine or rule of law except such as are adopted by and in force in the two states, if the same rule is adopted in both states.

Exception Fourteenth: The Special Master erred and mistook the law in holding that water can be taken from the watershed of an interstate stream and forever removed therefrom so as to deprive the lower State of the use thereof, without the exercise of the Legislative authority prescribed by the Constitution, which is the Legislatures of the two States, with the approval of the Congress of the United States.

Exception Fifteenth: The Special Master erred and mis-

took the law in holding that the commonwealth of Massachusetts has changed the law of riparian ownership and adopted the appropriation doctrine, when it enacted the Ware and Swift river Legislation.

Exception Sixteenth: The Special Master erred and mistook the law in holding that the Commonwealth of Massachusetts has adopted any system of law which will permit the diversion of any water from its streams except by the consent of all riparian owners or by legislative authority to take for public use.

Exception Seventeenth: The Special Master erred and mistook the law in holding that the Massachusetts legislation provides for the taking of the waters of the Ware and Swift rivers only.

Exception Eighteenth: The Special Master erred and mistook the law in holding that the recommendations of the War Department furnished adequate, permanent, or in fact any protection to the interests of the state of Connecticut against a diversion from the Ware or Swift river and other streams tributary to the Connecticut river, except such limitations as may be placed upon this project in the legislation enacted by the Great and General Court of the Commonwealth of Massachusetts.

Exception Nineteenth: The Special Master erred and mistook the law in holding that the acknowledged development of the Swift river and the construction of the aqueduct and tunnel, together with the territory to be supplied and the intention that all future water supply was to come from the west, are immaterial, and not relevant to the issues involved in this case.

Exception Twentieth: The Special Master erred and mistook the law in holding that the taking from the Ware river is limited to the flood waters.

Exception Twenty-first: The Special Master erred and mistook the law in holding that under the laws in force in both Massachusetts and Connecticut the defendant has any right to remove the waters from an interstate stream without the consent of the complainant state.

Exception Twenty-second: The Special Master erred and mistook the law in refusing to hold that the right to all flowing water, including flood water, is a property right, protected under the Constitutions of the United States, the state of Connecticut and the commonwealth of Massachusetts.

Exception Twenty-third: The Special Master erred and mistook the law in refusing to recommend that, if any taking is to be allowed, it shall be limited by decree of the court to the amount which Massachusetts, through its counsel, has undertaken to say, is to be the limit of their taking under the present plans; and in giving effect in his decision to the recommendations of the War Department, which are subject to change and modification by the War Department, without recommending that these recommendations be embodied in the decree of the court.

## EFFECT ON NAVIGATION

## EXCEPTIONS AS TO FACTS

Exception Twenty-fourth: The complainant excepts to that portion of finding of the Special Master, appearing on page 18:

> "There is no proof of difficulty in navigation at times when the stage of water is 12 feet or even 11 feet, 11 corresponding to an indication on the Hartford gauge of 3 feet. The discharge required from the Swift river reservoir during low water periods will somewhat benefit navigation. I cannot see how the diversion can injure navigation and therefore find that the proposed diversions will not interfere perceptibly or materially with the navigation of the Connecticut."

because said finding is contrary to the evidence; and the Special Master should have found that whenever the gauge at Hartford registers 2.1 feet or more there will always be a diversion from the Connecticut river, because the war Department's restrictions do not provide for any limitation of the diversion above 2.1 feet; and such diversion will materially affect the navigation of the Connecticut river both between Hartford and Holyoke and between Hartford and Long Island Sound; and the Special Master should have further found that in spite of the restrictions recommended by the War Department there will be diversions on an appreciable and material number of days in each year, and such diversions will materially affect the navigation of the Connecticut river between Hartford and Long Island Sound.

Beckwith, R. 830.
Reid, R. 848.
Bacon, R 911-919.
Hill, R. 923.
Burgi, R. 928.
Noble, R. 944.

**There is no rule or obligation on the part of Massachusetts to release water from the storage reservoir.**

**Exception Twenty-fifth: The complainant excepts to the failure and refusal of the Special Master to find the fol-**

lowing facts: that the Commonwealth of Massachusetts, by any of its agencies of government, has not submitted any plans or specifications as to any proposed dams, structures or works to be built or constructed in either the Ware or Swift Rivers to either the Chief of Engineers or the Secretary of War, nor have any plans or specifications been recommended by the Chief Engineers or the Secretary of War.

## EXCEPTIONS AS TO THE LAW

Exception Twenty-sixth: The Special Master erred and mistook the law in holding that the Congress of the United States has the power or authority to permit the waters of an interstate stream to be diverted from its watershed into another and different watershed without the consent of both of the States through which the water flows.

Exception Twenty-seventh: The Special Master erred and mistook the law in holding that the Congress of the United States has the power and authority to permit the waters of an interstate stream to be diverted for any purpose other than the improvement of interstate and foreign commerce.

Exception Twenty-eighth: The Special Master erred and mistook the law in holding that if Congress has such powers, that they can be delegated to and be exercised by the Chief of Engineers and the Secretary of War; and that if such delegation can be made, it has been made under the provisions of Sections 9 and 10 of the Rivers and Harbors Act of 1899.

Exception Twenty-ninth: The Special Master erred and mistook the law in holding that the proposed diversion dam on the Ware River and the proposed storage dam on the Swift River are not dams or structures within the meaning and intent of Section 9 of said River and Harbor Act.

Exception Thirtieth: The Special Master erred and mistook the law in holding that the waters of the Ware and Swift Rivers are not navigable waters of the United States within the meaning of Section 9 of said River and Harbor Act.

Exception Thirty-first: The Special Master erred and mistook the law in holding that as to the dams proposed to be built in the Ware and Swift Rivers, no plans and specifications need be submitted to and recommended by the Chief of Engineers and approved by the Secretary of War; nor need the consent of Congress be obtained for such structures as provided for in Section 9 of said River and Harbor Act.

Exception Thirty-second: The Special Master erred and mistook the law in holding that the diversion of water from one watershed into another does not affect the navigable capacity of the stream from which it has been taken.

Exception Thirty-third: The Special Master erred and mistook the law in holding that the affirmative act of Congress required in the first clause of Section 10 of the River and Harbor Act is satisfied when the Chief of Engineers or Secretary of War, by refusing to take or abstaining from taking action to prevent a diversion of water from one watershed to another for a non-navigable purpose, allows such abstraction to be accomplished.

Exception Thirty-fourth: The Special Master erred and mistook the law in holding that no affirmative act of Congress is required other than the remaining two clauses of Section 10 of the River and Harbor Act, wherein specific powers are given the Chief of Engineers and Secretary of War.

Exception Thirty-fifth: The Special Master erred and mistook the law in holding that the action of the Chief of Engineers and the Secretary of War in the present instance is legally sufficient to authorize the diversion, although no plans or specifications for the work proposed to be done were ever submitted to nor recommended by the Chief of Engineers nor have any plans or specifications ever been approved by the Secretary of War as provided in Section 10 of the River and Harbor Act.

Exception Thirty-sixth: The Special Master erred and mistook the law in holding that the finding of the Secretary of War that the diversion will not injure appreciably or materially navigation on the Connecticut River is conclusive, if the action is within his authority, upon the State of Connecticut.

Exception Thirty-seventh: The Special Master erred and mistook the law in holding that if the United States is willing to release the water from the burden of interstate and foreign commerce, this action precludes the State of Connecticut from objecting to the removal of such water from both interstate, foreign, and intrastate commerce.

Exception Thirty-eighth: The Special Master erred and mistook the law in holding that the jurisdiction of the United States extends beyond the use of water for interstate and foreign commerce.

## EFFECT ON POWER CAPACITY

## EXCEPTIONS AS TO THE FACTS

Exception Thirty-ninth: The complainant excepts to the

following findings of fact by the Special Master, appearing on pages 20 and 21:

> "This work so far as the testimony shows, has not been resolved on by the company, and so far as shown the required capital has not been subscribed or arranged for . . . . I know of no objection (assuming that the immaturity of the power project is not fatal) to the court requiring Massachusetts to pay to the power company or its assigns $80,000 if and when the power is developed to the extent stated,"

because the only power development discussed was one of the Northern Connecticut Power Co., which had already been approved by the Federal Power Commission, and the limitations prescribed by this body had been accepted by the corporation, which is an old and well established Connecticut company. The Special Master had no function to perform in this respect except to find whether or not the power possibilities of the river would be damaged by the threatened diversion; and he has placed the damage in this instance at $80,000, and made naïve suggestions that Massachusetts could condemn this power right and pay for it.

Exception Fortieth: The complainant excepts to that portion of the finding of the Special Master on page 21 which reads as follows:

> "from this should be deducted $80,000 representing a saving in capital investment resulting from the required addition to water in low flow furnishing 1,000 additional horse power at low states; this increase of minimum power would cause a corresponding decrease in steam power plant, which will be required to supplement the water in times of low flow. This $80,000 deduction was testified to by Mr. Weston Fuller whose testimony was not questioned."

> "Therefore it appears that if this water power

> is developed to the extent of 50,000 horsepower, the Massachusetts diversion of Ware and Swift waters will cause an injury to the power of $80,000."

because the figures were questioned, and the testimony for the complainant further showed that the net loss of the company after all deductions because of possible increase in flow in low stages, was $160,000.

> Jacobs, R. 323-326.
> Whitman, R. 359, 374.

Exception Forty-first: The complainant excepts to the refusal of the Special Master to find that this water power is a natural resource of the State of Connecticut, and that it will be damaged and depreciated and its development retarded 1% of energy under the Massachusetts legislation, and ¾ of 1% under the restrictions of the War Department.

> Jacobs, R. 325.
> Whitman, R. 359.

## EXCEPTIONS AS TO THE LAW

Exception Forty-second: The Special Master erred and mistook the law in holding that either the State of Connecticut or one of its citizens can be compelled to accept a sum of money for property rights belonging to them or either of them, without their consent.

Exception Forty-third: The Special Master erred and mistook the law in failing to find that the State of Connecticut has the right to have its natural resources remain intact and that they can not be taken from it by another state without its consent.

Exception Forty-fourth: The Special Master erred and mistook the law in holding that such damage was not material to the State of Connecticut.

Exception Forty-fifth: The Special Master erred and mistook the law in failing and refusing to find and report that the Acts of the Commonwealth of Massachusetts in the premises caused an appreciable and material damage to the power resources of the Connecticut River at least to the extent of $80,000.00 and that therefore an injunction should issue in accordance with the paper of complainant.

Exception Forty-sixth: That the Master erred and mistook the law in failing and refusing to recommend and report that injunction should issue in accordance with the Plaintiffs' prayer for relief—when said Master finds that the Power capacity on the river in the one instance under discussion was depreciated to the extent of at least $80,000.

## EFFECT ON AGRICULTURE

## EXCEPTIONS AS TO THE FACTS

Exception Forty-seventh: The complainant excepts to that portion of the finding of the Special Master as set forth on pages nineteen and twenty which states:

> "It needs no testimony to prove that floods and inundations frequently cause damage. The Mayor of Hartford in this case showed dykes built at considerable expense in Hartford to fend off Connecticut river floods."

insofar as the master has failed to find, in addition to the facts found, the following: that there was no need of dykes

or a dyke in Hartford until the aviation field was developed along the banks of the Connecticut river with a view to making a landing place for land and water planes.

Batterson, R. 1228.

Exception Forty-eighth: The complainant excepts to the portion of the finding of the master as set forth on page twenty, which states:

> "The benefit from inundation of the 9,500 acres of hay land is exceptional. The amount of injury to the hay crop likely to result from the Swift and Ware diversion was not proven,—probably is not capable of proof—and was left to conjecture. How much hay land would fail to be submerged because of the diversion is quite uncertain. The land owners who testified showed that the hay lands were not of uniform elevation; that sometimes small areas are not submerged resulting in a diminished crop."—

because it is directly contrary to the evidence given by the farmer land owners to the effect that the hay has been grown without fertilization for many years because of the flood waters; and that the farmers who own the land in the inundated area would not own the property but for this location and the flood benefits it receives; and that they bought this land with this in view; and that in some instances they specified the number of acres which would not be flooded in the event this taking was permitted.

Carrier, R. 744, et seq.
Isaacson, R. 758, et seq.
Hale, R. 774, et seq.
Howe, R. 786, et seq.
Hardin, R. 796, et seq.
Hollister, R. 805, et seq.
Dunham, R. 810, et seq.
Goodrich, R. 816, et seq.
Adams, R. 823, et seq.

Newberry, R. 873, et seq.
Christensen, R. 867, et seq.
Morgan, R. 891, et seq.
Stipulation of Counsel, R. 888.

Exception Forty-ninth: The complainant excepts to the portion of the finding of the Special Master as set forth on page twenty which states:

> "The lessening of spring floods will have its advantages and disadvantages. It will lessen some damages and increase other. On the whole I think the damage to the hay land is not shown to be of 'serious magnitude'; and that such damage, far from being 'established by clear and convincing evidence', is shown by no evidence making it possible of computation or proving that it is large."—

inasmuch as it is without evidence to support it, and the Special Master should have found, in lieu thereof, that counsel stipulated as to the number of acres that would be subjected to damage because of the loss of flood waters, and that this damage having been proved the question of serious magnitude was not in the case; that the stipulation was entered into by counsel after the witnesses had all been summoned to court and after a number had actually testified; that the stipulation was entered into to save time with the distinct understanding, as stated in the record, that other farmers owning land in the Connecticut Valley were present in court and prepared to testify to the damage which they would sustain. There was not a scintilla of evidence in the record that any damage was done by the spring floods.

> Stipulation, R. 888, and Remarks of Counsel pertaining thereto.

Exception Fiftieth: The complainant excepts to the failure and refusal of the Special Master to find the following facts:

That the damage to the agricultural lands in the Connecticut River Valley is appreciable and material. The damage caused is not confined to those portions of the land which will not be covered by the flood waters, but the damage also extends to the total amount of land flooded during the high flows, because of the fact that every inch of lessening of the water deprives the total acreage of the land flooded of that much of the fertilizing qualities of the flood water.

Morgan, R. 895, -6, 909.

## EXCEPTIONS AS TO THE LAW

Exception Fifty-first: The Special Master erred and mistook the law in holding that it was incumbent on the complainant to show the money value of the damage to the land in the Connecticut River Valley caused by a lessening of the annual flood flows of the river, after the complainant had proved that the action of Massachusetts would cause material damage.

Exception Fifty-second: The Special Master erred and mistook the law in failing and refusing to hold that the rights of the riparian owners of the lands along the Connecticut River are property rights protected by the constitution of both the State of Connecticut and of the United States.

Exception Fifty-third: The Special Master erred and mistook the law in failing and refusing to hold that such property rights cannot be taken from either the property owners or the State of Connecticut by the legislative act of the Commonwealth of Massachusetts without the consent of the State of Connecticut.

## POLLUTION

### EXCEPTION AS TO THE FACTS

Exception Fifty-fourth: The complainant excepts to the finding of the Special Master, set forth on page 28, as follows:

> "I think the plaintiff has failed to prove that the proposed diversion would perceptibly increase Connecticut river pollution, and consequently that there is no satisfactory proof of material pollution damage to the Connecticut to result from installing and operating the proposed Ware and Swift works."

Whereas, the Master should have found that the Connecticut River at the State Line between Massachusetts and Connecticut in the autumn of a fairly average year is on the border line of a nuisance, and any material diversion will probably make portions of the river a nuisance; that during 1929 there were 79 instances of dissolved oxygen being below 50% saturation which was dangerous; and that the Connecticut river at the State line is at the present time unsafe for bathing.

> Winslow, R. 512, 513.
> Rudolfs, R. 427.

Exception Fifty-fifth: The complainant excepts to that portion of the finding of the Special Master appearing on page fifty-four, where, after discussing the Massachusetts pollution of streams, he states,

> "However, her practice has not been different from that of Connecticut."

Whereas the Special Master should have found that the State of Connecticut has established a State Water Commis-

sion which is charged by law with the removal of pollution from the waters of the state; that the principal purpose of such removal is to make such waters available for the future water supplies of the towns and cities of Connecticut; that the State of Connecticut itself has caused the removal of pollution from the Connecticut River, where it owns a tract of land near the city of Middletown and used as a State Hospital for the insane and from other streams within the state where state institutions formerly discharged sewage into them; that nearly all large cities and all cities on the Connecticut River have adopted measures varying from the initial stage which is an engineering survey to show what should be done, up to and including the installation and operation of a system of sewage disposal; that the City of Hartford has adopted a program of expenditure in excess of $3,000,000 to treat sewage prior to discharge into the Connecticut River; that New Britain and Middletown, two other cities discharging into the Connecticut, are engaged in surveys for treatment plants; that the last General Assembly of Connecticut incorporated a Metropolitan District of Hartford consisting of some five towns which must be provided with water; that it is the opinion of the Commission that the Hartford District will be one of the first to have to go to a large stream for its future supply, and that the Connecticut should be held for that purpose.

Wadhams, 980-1004.

And the Master should have found further that the Great and General Court of the Commonwealth of Massachusetts had, by legislative enactment, excepted the Merrimac River and the Connecticut River from the jurisdiction of the State Department of Health, leaving these two streams as practically open sewers without any effort on the part of the Commonwealth of Massachusetts to control them or to better them.

Goodnough, R. 1591, 1592.

## EXCEPTIONS AS TO THE LAW

Exception Fifty-sixth: The Special Master erred and mistook the law in failing to find that Massachusetts has no right to pollute the waters of an interstate stream to such an extent that they are delivered to the State of Connecticut at the state line in such condition as to be unsafe for bathing and so near the border line that any appreciable diversion therefrom will make the stream become a nuisance, and that so long as the stream remains in such polluted state water can not be diverted from it by the state responsible for the polluted and dangerous condition.

## EFFECT ON FISH LIFE

## EXCEPTIONS AS TO THE FACTS

Exception Fifty-seventh: The complainant excepts to that portion of the finding of the Special Master appearing on page twenty-two, reading as follows:

> "On the evidence I find that the lowering of flood water resulting from proposed diversions is not shown to be materially injurious to the shad run."

because the Special Master should have found that there are a number of days when the river is so polluted at the state line that fish like shad either migrate or die.

Rudolfs, R. 441.

and that during the whole summer the water is on the border line, and that any quantity of water taken out of the river will be detrimental.

Rudolfs, R. 470-483.
Fraser, R. 960.
Titcomb, R. 964-970.

## AVAILABLE SUPPLIES IN EASTERN MASSACHUSETTS

### EXCEPTIONS AS TO THE FACTS

Exception Fifty-eighth: The complainant excepts to that portion of the finding of the Special Master appearing on page 50, which states:

> "For example it appears in the evidence that the city of Lawrence, Massachsetts, is the only town using Merrimack water for drinking. The result is a most extraordinary sale of bottled water in Lawrence. It is delivered generally like milk. 1916 statistics showed that the amount of money paid in Lawrence for bottled water was 55% of the total amount paid for public water for all purposes. To force people to bottled water is not conducive to the public health. Such facts as those about Lawrence also show a reason why public opinion ought to be regarded in selecting water supply."

because there is no evidence to support any of the statements above quoted, except the 1916 statistics which were contained in the report of an engineer recommending a new water supply; and the evidence showed and the Master should have found that in 1916 a survey was made, and upon a report received from the engineers the city of Lawrence appropriated money and built additional filter plants, refusing to adopt the suggestion of the engineer that the Merrimac supply be abandoned, preferring to use a filtered and properly treated supply; and that since the installation of the filter plants the records show that the supply obtained from the Merrimac was as good as or better than the supply now furnished to the people of Boston by the Metropolitan Commission; and that the evidence also shows that no survey

of the amount of spring water consumed in Lawrence has been made since 1917.

McCarthy, R. 1779.
Jacobs, R. 2223.

Exception Fifty-ninth: The Complainant excepts to that portion of the finding of the Special Master, appearing on page 45, which states:

> "The Merrimac river has thus become a legalized public sewer."

and again on the same page:

> "There is no certainty of its improvement and no certainty that it will not become more polluted."

because the language above quoted is directly contrary to the evidence, and the Master should have found,

> "The condition of the Merrimac river has been improving steadily from 1918 to 1929."

Eddy, R. 2058.

Exception Sixtieth: The complainant excepts to the failure of the Special Master to find, in accordance with the undisputed testimony of several of the witnesses, that in regard for the safety of the users of the water furnished by the Metropolitan District Water Supply Commission requires that the present water supply should be treated.

## EXCEPTIONS AS TO THE LAW

Exception Sixty-first: The Special Master erred and mistook the law in failing and refusing to find that Massachusetts, having pleaded or set up in its answer the affirma-

tive allegation that there was no other source of supply except the supply from the Connecticut Valley watershed, and that unless this taking was permitted great suffering and hardship would ensue, the burden of proof was upon Massachusetts to prove that there was no other source of supply; and that there was a necessity as distinguished from a choice or option; and that the failure of Massachusetts to sustain this allegation in its answer by adequate proof was fatal; and that it was not incumbent upon Connecticut in defending its rights to go into Massachusetts and find available water supplies and prove the existence of their availability.

Exception Sixty-second: The Special Master erred and mistook the law in failing and refusing to find that the burden of proof in showing the necessity for taking waters from an interstate stream, when the taking would work even a slight damage to the adjoining state, was upon the state taking such unusual action.

Exception Sixty-third: The Special Master erred and mistook the law in failing and refusing to find that the burden of proving the necessity for taking waters which contribute to the navigability of an interstate stream was upon the state desiring to take such waters.

Exception Sixty-fourth: The Special Master erred and mistook the law in finding as set forth on page fifty-one of his report as follows:

> "Having found on the first branch of the case that Connecticut will not be substantially and seriously injured by the Ware-Swift diversion and the people of Massachusetts having made their decision in favor of the Ware and Swift, conceding that it is open to Connecticut to ask this Court to overrule the Massachusetts determination and relegate Boston and the Metropolitan District to the water supplies in the

> eastern part of the state, certainly the burden is on Connecticut to make peculiarly clear and conclusive showing. I content myself with finding that no such showing has been made. Giving the proof of Connecticut the utmost weight it no more than raises a doubt."

and on page twenty-nine of the report:

> "And were it made clearly to appear that Boston and the other population in northeastern Massachusetts have an abundance of perfectly good water at home, that might be a good reason why equity should enjoin their going to the Connecticut watershed and thereby causing a neighboring state even a small damage.
>
> "In this view, I have regarded as important the allegation of Connecticut in an amendment to the bill that the Boston district as well as the neighboring population can well be supplied with good water from the eastern part of the state."

whereas, under the pleadings and the rules, the burden was upon Massachusetts to show that it had no other available supply and that the taking of this water was a necessity.

---

Exception Sixty-fifth: The complainant excepts to the misstatement by the Special Master of the position of Connecticut, appearing on pages 49 and 50 of the report, as follows:

> "Connecticut in this respect is calling on the Supreme Court of the United States to determine how much water supply is now available and will continue available for a long period of time for the inhabitants of the whole northeastern part of Massachusetts; to determine how much of this water is fit for human use and will remain so far a long period

> of years; to say how much of it ought to be fitted for use, involving cost and expense of fitting reasonable to be imposed on the public; and to divide the supplies among the towns and cities and other communities of the region."

whereas Connecticut has contended that the supply in eastern Massachusetts was adequate, and by reasonable and proper treatment could be made available. Connecticut has never contended that the Supreme Court of the United States should determine how much water was fit for human use or how long it would remain so, or how much of it ought to be fitted for human use or that the question of cost and expense of fitting the water for use was a question before the Supreme Court, or that the Supreme Court had any function whatever to perform in dividing the waters among the towns and other communities in this region; and such a conclusion is unwarranted and unfounded on any claim made in pleadings, evidence or argument in the case.

## THE QUESTION OF NECESSITY

### EXCEPTIONS AS TO THE FACTS

Exception Sixty-sixth: The complainant excepts to the failure and refusal of the Special Master to find that all of the Massachusetts experts testified that if the Ware and Swift river waters could not be obtained, eastern Massachusetts could be supplied with water.

Kennison, R. 1944, 2129.
Barber, R. 1989.

Exception Sixty-seventh: The complaint excepts to that

portion of the master's findings set forth on page six of the General Facts, which states:

> "In addition Connecticut alleges by an amendment to its bill that the Boston district can well be supplied with good water from the eastern part of Massachusetts and for this reason should be enjoined from subtracting in the least from the flow of water into the Connecticut."

whereas the Special Master should have found that the Commonwealth of Massachusetts pleaded in its answers that it requires a suitable supply of pure and unpolluted drinking water, *which can be obtained from no other source within the Commonwealth except from the watershed of the Connecticut River*, Answer, Page 30.

By reason of the great emergency existing in the Commonwealth of Massachusetts, as above set forth, because of the great and immeasurable suffering which would be caused to the citizens of Massachusetts if said diversion be not permitted, and in consideration of the fact that the State of Connecticut and the inhabitants thereof will suffer no material damage by reason of said diversion.

Answer, Page 32.

And that the Commonwealth of Massachusetts affirmatively alleged a great and pressing necessity which could be met in no way other than to take the waters of an interstate stream, which contributed to the navigability of the Connecticut river, and the Commonwealth of Massachusetts did not introduce any proof whatever in support of its allegations, but it was proved by abundant testimony that there was an abundant and adequate supply in eastern Massachusetts.

Barbour, R. 1989, 1998.
Kennison, R. 1842-1845, 1944.
Jacobs, R. 1027 et seq.
Sanborn, R. 1911.
Fuller, R. 2018.
Eddy, R. 2088.
Exhibit C-1, 159.
Exhibit C-2, 14.
Exhibit C-3, 103.
Exhibit C-32 and C-39.

## EXCEPTIONS AS TO THE LAW

Exception Sixty-eighth: The Special Master erred and mistook the law in determining the question of necessity by disregarding entirely the testimony that contaminated or polluted water can be treated scientifically and made pure and wholesome for domestic use, and that many of the larger cities in the world are supplied in this manner.

Exception Sixty-ninth: The Special Master erred and mistook the law in holding that in deciding the question of necessity the question of abandonment of existing and usable water supplies could not be considered.

Exception Seventieth: The Special Master erred and mistook the law in holding that the party pleading necessity has a choice of supplies which can be considered.

Exception Seventy-first: The Special Master erred and mistook the law in holding that in determining the question of necessity for domestic use as set forth in the plea of necessity in the defendants' answer, the use of water for industrial and recreational purposes must be given consideration.

Exception Seventy-second: The Special Master erred and

mistook the law in holding that in determining the question of necessity the first fact and the important one is that the people of Massachusetts decided against the existing eastern water supply by passing the Ware and Swift legislation.

Exception Seventy-third: The Special Master erred and mistook the law in holding that in determining the question of necessity the court should take into consideration the fact that important factories using water for process water, which might be diverted and thereby infringe upon their manufacturing requirements was an important and governing factor in the consideration of the prier.

Exception Seventy-fourth: The Special Master erred and mistook the law in failing to find and give legal effect to the testimony of all the Massachusetts experts to the fact that if Massachusetts could not take the water from the Ware and Swift rivers, a supply in eastern Massachusetts could be obtained.

Exception Seventy-fifth: The Special Master erred and mistook the law in holding that the proceedings beginning with the letters of the Metropolitan District Water Commission to the Secretary of War and the subsequent correspondence between these parties was a compliance with the provisions of the Acts of Congress enacted for the protection and development of navigation and navigable capacity of the waters of the United States.

Respectfully submitted,

THE STATE OF CONNECTICUT

By BENJAMIN W. ALLING,
*Its Attorney-General.*

ERNEST L. AVERILL,
*Deputy Attorney-General.*
BENEDICT M. HOLDEN,
*Special Counsel.*

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# In the Supreme Court of the United States

OCTOBER TERM, 1930

**Original No. 12**

STATE OF CONNECTICUT

*v.*

COMMONWEALTH OF MASSACHUSETTS

## IN EQUITY

## BRIEF FOR THE COMPLAINANT IN SUPPORT OF EXCEPTIONS TO REPORT OF SPECIAL MASTER

BENJAMIN W. ALLING,
*Attorney-General of the State of Connecticut.*

ERNEST L. AVERILL,
*Deputy Attorney-General.*

BENEDICT M. HOLDEN,
*Special Counsel.*

THE CASE, LOCKWOOD & BRAINARD CO
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# In the
# Supreme Court of the United States

OCTOBER TERM, 1930

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**Original No. 12**

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STATE OF CONNECTICUT

*v.*

COMMONWEALTH OF MASSACHUSETTS

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# IN EQUITY

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## BRIEF FOR THE COMPLAINANT IN SUPPORT OF EXCEPTIONS TO REPORT OF SPECIAL MASTER

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### II. PLEADINGS

This is an action brought under the original jurisdiction of the Supreme Court of the United States by the State of Connecticut, Complainant, to enjoin the Commonwealth of Massachusetts from abstracting waters from tributaries of the Connecticut River, a navigable stream which flows through Massachusetts and Connecticut to Long Island Sound, an arm of the Atlantic Ocean. The bill was filed by leave of the Court January sixteenth, nineteen twenty eight.

## COMPLAINT

The Bill of Complaint alleges:

1. Recognition in Connecticut and Massachusetts of the Common Law doctrine of riparian rights as that is understood to give the riparian owners the right to the undiminished flowage of all streams, which flowage is to be free from contamination or burden of any kind placed upon it by the other riparian owners. (P. 3, par. 1.)

2. That the State of Connecticut is the owner of a tract of land on the west bank of the Connecticut River at Middletown upon which is located the Connecticut Hospital for the Insane. (P. 6, par. 2.)

3. That the State of Connecticut appears as the proprietor of riparian lands, as the owner of the bed of the Connecticut River within the State of Connecticut and as *parens patriae*. (P. 6, par. 1, 2, 3.)

4. That the Connecticut River is a navigable body of water and that the Ware and Swift and other tributaries contribute to the navigable capacity of the Connecticut River. (Pp. 2, 3, 4, 5.)

5. That the effect of the action complained of on the part of Massachusetts will be to take and remove water which contributes to the navigable capacity of the Connecticut River entirely out of the watershed and forever prevent it from continuing to contribute to the navigable capacity of the Connecticut River. (P. 9, par. 1.)

6. That such action will take away the flood waters and thereby cause a damage to agricultural interests in Connecticut. (P. 7, par. 1, 2.)

7. That the Connecticut River is now heavily burdened with sewage and offensive matters discharged into it within the limits of the Commonwealth of Massachusetts and that the burden is now so heavy that it requires all of the water that naturally comes down the river to take care of it and prevent it from becoming a nuisance and a menace to public health in Connecticut. (P. 8, par. 1.)

8. That such taking will destroy property and property rights of the State of Connecticut and of citizens of the State of Connecticut located within its territorial limits and cause injury for which there is no adequate remedy at law. (P. 9, par. 2.)

9. That Massachusetts threatens and intends to take property of the State of Connecticut and to destroy and irreparably damage property of the State of Connecticut and its citizens without due process of law. (P. 11, par. 2.)

10. That the present diversion is only a portion of a general plan adopted by Massachusetts which includes the acquisition of the waters of other tributaries of the Connecticut River. (P. 10, par. 1, 2.)

## ANSWER

Massachusetts in an answer to the bill:

1. Pleaded necessity to secure additional waters for domestic purposes and alleged that this additional water can be obtained from no source in the Commonwealth of Massachusetts except from the watershed of the Connecticut River as has been authorized in legislation with respect to waters of the Swift River and the Ware River. (Reprint of Answer, paragraph 25; First sub-Division, pp. 30, 31.)

2. Admitted that the Commonwealth of Massachusetts in accordance with the provisions of the said acts of the Great and General Court of the Commonwealth, proposes to divert the flood waters of the Ware River, as defined in said acts, and proposes to construct, by building dams in the valley of the Swift River, a reservoir which will cover with water a large area in the valley of the Swift River. (Reprint of Answer, paragraph 17, pp. 20, 21.) That unless enjoined from so doing, it intends to proceed with the work authorized by the Great and General Court of Massachusetts in the Acts of 1926, Chapter 375, and the Acts of 1927, Chapter 321.

3. Denied that the waters of all or any of the said tributaries are necessary to maintain and preserve the flow of the Connecticut River. (P. 10, par. 7, p. 14, par. 14.)

4. Averred that by the law of both the Commonwealth of Massachusetts and the State of Connecticut owners of riparian lands are entitled to make reasonable and equitable use of the waters of streams flowing by or through their land provided that such use is not inconsistent with a similar reasonable and equitable use of the said stream by lower riparian owners. (Reprint of Answer, paragraph 4, p. 5.)

5. Denied that it was necessary to obtain a permit from Congress, the War Department, the Secretary of War, or the Chief of Engineers for the erection of any structures as such in a non-navigable river and stream and denied interference with interstate commerce or that there was any necessity of permission being obtained from the War Department or the Secretary of War before any of the Acts and things referred to in the bill of complaint may be lawfully done. (Reprint of Answer, paragraph 5, p. 6.)

6. Alleged the making of a formal application to the War Department for permission to divert water from the Swift and Ware Rivers in accordance with the terms of the Acts of the Great and General Court of Massachusetts. (P. 7, par. (a).)

7. Alleged the receipt of communications from War Department that no objection would be interposed to diversion of the Ware and Swift within certain limits. (P. 7, par. (b); p. 8, par. (c); Appendix B, p. 81; Appendix C, p. 102.)

8. Averred the existence of an adequate remedy at law for the State of Connecticut and its citizens for any injury caused by diversion. (Reprint of Answer, p. 31, par. 2.)

9. Averred that the diversion will not materially diminish the flow of the Connecticut River and that the project is a reasonable use of the waters of the Swift and Ware Rivers. (Reprint of Answer, p. 14, par. 14; p. 18, par. 16.)

10. Averred that Connecticut and lower riparian owners will benefit from release of waters during low stages of the stream flow. (Reprint of Answer, pp. 14, 15, par. 14; p. 22, par. 17.)

11. Denied that the diversion would in any way affect the navigable capacity of the Connecticut River. (P. 12, par. 11.)

12. Denied that the diversion would in any way adversely affect the fertility of the soil on the banks of the Connecticut River. (P. 14, par. 14.)

13. Denied that the present normal flow of the Connecticut River was necessary to dilute and carry away the sewage discharged into it. (P. 28, par. 22.)

In due course the matter was referred to the Honorable Charles W. Bunn as Special Master, who, acting under the Order of this Honorable Court and in compliance with its rule, heard the evidence and made and filed his Report, together with his recommendations.

Massachusetts waived its right to file any Exceptions to the Report of the Special Master and the matter is now before the Court on the Bill of Exceptions filed by the State of Connecticut.

## III. JURISDICTION

As sustaining the plaintiff's contention that this Court has jurisdiction and that a justiciable controversy is presented, we refer to

Cohens *v.* Virginia, 6 Wheat., 263.
Missouri *v.* Illinois, 180 U. S., 208; also 200 U. S., 496.
Kansas *v.* Colorado, 185 U. S., 125.
New York *v.* New Jersey, 256 U. S., 296.
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Pennsylvania *v.* W. Virginia, 262 U. S., 553.
Georgia *v.* Tennessee Copper Co., 206 U. S., 237.
Wisconsin *v.* Illinois, 278 U. S., 367.

## IV. STATEMENT OF THE CASE

The motions to dismiss the answer and to strike out portions of the answer which were before this court a year ago were denied without prejudice. Such disposition of these motions leaves all of the questions of law therein raised to be determined upon the facts which have been presented in this case.

The Commonwealth of Massachusetts claims that the jurisdiction of this Court partakes that of an arbiter of controversies between states and is not confined to the administration of law and equity as it exists in the ordinary judicial branch of government, and therefore this case cannot be considered solely from the standpoint of a controversy in which principles of law and equity are to obtain but the facts presented must also be considered from the viewpoint of policy and statesmanship rather than from the viewpoint of purely legal principles.

This conception of the jurisdiction and the function of this court are not conceded by the State of Connecticut and we do not anticipate that such a conclusion will be the final decision of the court. However, for the purposes of this case, it is incumbent upon us to present our case with the idea that this may be the ultimate conclusion of the Court. Consequently our presentation of the case has taken on a much broader aspect than would otherwise have been the situation.

The case of the State of Connecticut will be presented in the following order with an extended discussion of each subject in detail. To give the Court a general idea of the controversy as we view it, we will first discuss briefly what we claim to have proven under each of the following headings:—

Massachusetts Project
Navigation
Power
Agriculture
Pollution
Fish Life
Available Supplies in
Eastern Massachusetts
Necessity

## MASSACHUSETTS PROJECT

By legislative acts of the Commonwealth of Massachusetts a special commission known as the Metropolitan District Water Supply Commission has been created and charged with the duty of taking certain specified waters of the Ware and Swift Rivers located within the Connecticut River watershed in Massachusetts and transporting them into an entirely different watershed for the purpose of supplying the people residing in northeastern Massachusetts with water. It is also authorized to acquire by purchase or eminent domain any other waters it may deem necessary or advisable for the same purpose except the Millers River.

It is also instructed to construct tunnels, aqueducts, dams and reservoirs of sufficient size and dimensions to carry out this purpose and these are to be in substantial accordance with House Document No. 1,550 of 1922. (Ex. C-1.)

The present taking of the Ware and Swift Rivers is a determinable amount and is in excess of 2% of the average flow of the Connecticut River at the Connecticut-Massachusetts state line. It takes not only the so-called flood flows of the two streams but also a substantial percentage of the ordinary and low flows of both streams.

Work on the tunnel and diversion dam required to take the Ware River has been started and continued since this case was presented to this Court and the purchase of land for the Swift River development has also been accomplished during this period. So that all moneys have been expended regardless of the fact that this case has been pending and was not expended prior to the action of Connecticut.

The project is the result of years of study and reports by several eminent Engineers and Commissions representing the Great and General Court of Massachusetts and is the consummation of a policy recommended in 1895 to ultimately supply eastern Massachusetts with water from the Connecticut River watershed.

The policy is based upon the assumption that no additional water is to be taken from any eastern streams and where such streams are now used a portion of them are to be abandoned as sources of water supply when the western waters have been made available for use.

The streams in Eastern Massachusetts have been allowed to become polluted by both municipal sewage and industrial waste and it is the intention of the Commonwealth of Massachusetts to permit this condition to continue and refuse to allow the use of those waters for a domestic water supply.

It is the intention of the Commonwealth of Massachusetts to secure its future water supply for all of northeastern Massachusetts from the Connecticut River watershed and plans for such additional diversions of water must be started by the year 1955 or 1960 because the supplies must be obtained and available by the year 1970.

While for navigation purposes only the War Department of the United States has indicated that the diversions proposed by the legislation of Massachusetts should be modified so that the average diversion will be reduced to at least 2% of the average flow of the Connecticut River at the Connecticut-Massachusetts state line, this proposed modification has never been reported to the Great and General Court of Massachusetts and no modification of its legislation has been made.

Even under the proposed modifications of the War Department, the diversion of the Ware and Swift waters will be determinable and will constitute a taking of the property rights of the State of Connecticut and of its citizens.

## NAVIGATION

Navigation by both pleasure and commercial craft actually exists between Hartford and Holyoke. It requires at least 4½ feet of water on the Hartford gauge to navigate. Even under the War Department's suggestions there will always be a diversion at that gauge height and such navigation will be adversely affected.

Between Hartford and Long Island Sound there is substantial commercial navigation. The United States by act of Congress has established a project depth of 12 feet when the Hartford gauge is at 2 feet and a channel 100 feet wide but this project has never been completely maintained either as to the width or depth of the channel.

This navigation will be affected by any diversion of water. When the Hartford gauge is at 2.1 feet or above no protection will be afforded by the War Department's suggestions as to the Swift River diversion.

Although the War Department's suggestions undertake to increase the flow in the Connecticut River when the Hartford gauge is 2.1 feet or less, actually there will be diversion instead of increase a substantial portion of the time.

The adverse results to navigation due to the delays, damage to the hulls of vessels, and the necessary lightening of cargo

are all due to lack of water and are reflected in the transportation rates charged to the consumers.

## POWER

There is one power plant now existing on the Connecticut River a few miles below the Connecticut-Massachusetts state line. It is susceptible of increased development either by an enlargement of its present facilities or by the construction of a new dam and power development.

A new site has been determined upon and the Federal Power Commission has granted a permit for the new development after finding that the company has complied with the laws of both Connecticut and Massachusetts and that it is able to carry out the proposed plans.

The proposed diversion under the Massachusetts legislation will reduce the productive capacity of the plant 1% and under the War Department's suggestions there will be a reduction of ¾ of 1%.

## AGRICULTURE

During all of our history, Connecticut farmers in the Connecticut meadows have depended upon the fertilizing effects of the high flows of the river to provide them with a quality of hay which cannot be produced upon the higher ground. This has been accomplished without the use of fertilizer due to the deposits of silt from the inundations at particular times of the year. Two crops of hay are produced each year on about 9,500 acres of such land. In addition there are some 1,650 acres devoted to other crops besides hay. The rights to these waters have always been considered as vested property rights by our courts.

The greatest amount of water proposed to be diverted will be taken at the time when these lands need it. There will be a reduction of from 3 to 6 inches even under the War Department's suggestions.

The injury occurs to such portions of the land as is not inundated and also all land which is covered will be injured because of the loss of fertilizing material contained in the amount of water removed.

## POLLUTION

The quality of the water of the Connecticut River, as it enters Connecticut from Massachusetts at the State line, is highly polluted. During portions of the year it passes the border line between being an avowed nuisance and not. The river being so close to becoming a public nuisance, any taking of water will not only make conditions worse, but may convert a possibility into an actuality. The water, as delivered from the Commonwealth of Massachusetts, is so highly polluted that it will be extremely difficult to make it available as a part of the water supply of the Metropolitan District of Hartford; it is unsafe at present for bathing; and every year it is growing worse. With the increasing population of Springfield, West Springfield, Chicopee, Holyoke, and other municipalities in Massachusetts adding constantly to the burden of the river in disposing of their sewage and industrial wastes, it will be dangerous to Connecticut to permit a reduction in the stream flow while such conditions exist.

Connecticut has a definite policy relating to its water having regard to the future needs of the State. By its legislation

it has inaugurated the policy of removing from its streams as fast as possible all forms of pollution, whether it be in the form of sewage or industrial wastes. The State itself has provided for the sewage of its institutions, and definite plans have been formulated to secure the purification of the Connecticut River by Hartford and other municipalities upon the stream. This is not based solely upon a public health basis. It is an economic policy. Connecticut realizes that the future will necessarily disclose the need for water by our several communities; that if the whole State is to grow, one portion cannot do so at the expense of the other; that, to avoid this, the waters of each locality should be cleaned up so that when the need arises water can be made available with the least possible expense for treatment. In the opinion of our State Water Commission, Connecticut cannot afford to permit the taking of any water now flowing into the State, if its municipalities and particularly Hartford are to be protected in their future requirements.

## FISH LIFE

The condition of the water in the Connecticut River as it is delivered to us by Massachusetts is such that in times of low flow it is on the border line as to fish life—they must either migrate or die. With conditions steadily becoming worse by added pollution with increased population, we cannot afford to permit any loss of water.

The period of greatest diversion occurs when the high flows are needed to flush out the stream and furnish the fresh water needed to attract the fish to the upper portions of the river.

## AVAILABLE SUPPLIES

While no part of Connecticut's case, the answer of Massachusetts affirmatively alleged that because there were no avail-

able supplies existing in eastern Massachusetts it was necessary to take the waters of streams in the Connecticut River watershed. To rebut this claim evidence was produced to show otherwise.

Exhibits "C-1," "C-2," and "C-3," being official reports made at the behest of the Great and General Court of the Commonwealth, were carefully and elaborately prepared by some of the best water supply engineers of the country. Each of them shows ample water supplies in eastern Massachusetts, admits that they are available and usable and some of them are recommended for development.

In addition our own engineers verified the existence of these supplies and suggested possible plans for their development. Not satisfied with our engineers' plans, Massachusetts engineers produced what they considered was a better plan which would produce as much water as is contemplated to be procured from the present Ware and Swift development.

If precluded from taking the waters of the Connecticut River watershed, there is no question but there is ample water physically present in eastern Massachusetts which can be developed and used.

## NECESSITY

It is claimed by Massachusetts that it is necessary to take the waters of the Ware and Swift Rivers which are now being used by Connecticut and its citizens because of a lack of available water in eastern Massachusetts. It is further claimed that this necessity is of such high importance as to warrant this Court in discarding the common law riparian doctrine which has always existed in both Connecticut and Massa-

chusetts and substituting for it a principle of law and equity which has heretofore been unknown. If this is correct, it becomes of first importance to find the true meaning of the term "necessity."

Apparently its ordinary meaning is not intended to apply. All of the Massachusetts experts agreed that if it became impossible to acquire the Ware and Swift waters that it would be possible to supply eastern Massachusetts with water from their own sources of supply but if the Ware and Swift could be obtained it was preferable to take them.

It is conceded that there are two sources of supply available which have not as yet been developed and which will yield 85 million gallons per day, an amount which is more than half the present supply of the Metropolitan District. So that a present necessity cannot be said to exist.

Exhibits "C-1," "C-2" and "C-3" before referred to, all state that there are other undeveloped sources in eastern Massachusetts which can be made available but which will require modern scientific treatment to make them usable.

That these sources of water supply require treatment is because Massachusetts has permitted them to become polluted, has no expectation of either cleaning them up or preventing further pollution and intends their removal from potential sources of a water supply.

Necessity from the Massachusetts viewpoint apparently means that it has a choice of what waters it will preserve for domestic use and what it will permit to be destroyed for such use regardless of where they may be situated or who may be now using them and whether the people affected are its subjects or not.

## THE REAL ISSUE

From our point of view this is a case involving the future of two States of the Union. It is not altogether a problem of the present. We do not believe that if Massachusetts is once permitted to take these waters, they will ever be returned no matter how much conditions may change during the next century. We do not believe that the present taking represents all that Massachusetts will ever take. At best it represents an additional supply for a few years, and must be followed by a demand for more. When that time comes we do not feel too confident that it will be refused. The opening wedge has been driven, and there is no return. This is the only possible opportunity Connecticut can have to thoroughly present and try out its claim to protection for the present and for the future.

While it may seem that the issues here presented might better form the subject of negotiations between the two States looking to a possible interstate compact, this has not been the policy adopted by the Commonwealth. The legislation was passed, the work started, and the only recourse left to Connecticut was to present its case before the Supreme Court of the United States. Under the Constitution this tribunal is the first, the last and the only protection which Connecticut can seek to protect what it believes to be the rights of the State and of its citizens.

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## V. MASSACHUSETTS PROJECT

*Massachusetts is naturally divided into two watersheds*

To enable the Court to have knowledge of the topography of the territory involved, we have prepared an adaptation of Ex. C-10, and file herewith a map entitled "Map Showing Watercourses in Massachusetts and Connecticut, and East-West Drainage Divide in Central Massachusetts," showing the States of Massachusetts and Connecticut with their rivers and water courses and indicating the location of the range of hills which divides Massachusetts' streams into two watersheds.

The Connecticut valley is separated from the eastern portion of Massachusetts by a range of high hills or mountains extending generally north and south from New Hampshire to Connecticut.

*The Western Section of Massachusetts lies in the Connecticut Valley*

The Connecticut River is a navigable, interstate stream, rising in the Connecticut lakes of northern New Hampshire, flowing southward between New Hampshire and Vermont across Massachusetts and Connecticut to Long Island Sound (Report of Special Master, p. 2). It is the largest river in New England, about 345 miles long, and the drainage area within the Commonwealth of Massachusetts is approximately 3,130 square miles. Four rivers—the Millers River, the Deerfield River, the Chicopee River, and the Westfield River,—flow into it in Massachusetts and contribute to the navigable capacity of the Connecticut River. The Chicopee River is formed by the confluence of three principal tributaries, the Swift River, the Ware River, and the Quaboag River.

*The Eastern Rivers drain into the Atlantic Ocean in Massachusetts*

The main streams draining into the Atlantic Ocean in the Commonwealth of Massachusetts include the Neponset, the

Charles, the Ipswich and the Merrimac Rivers. The Merrimac is the second largest river in New England. The present Boston Metropolitan water supplies are developed on two tributaries of the Merrimac—the Nashua and the Sudbury. In addition to these two, the Merrimac tributaries in Massachusetts include the Assabet which, together with the Sudbury, forms the Concord River and flows into the Merrimac at Lowell, and the Shawsheen which flows into the Merrimac at Lawrence.

*The Metropolitan Water District lies in the Eastern watershed*

In order to provide the inhabitants of Boston and certain of the surrounding cities and towns in the eastern watershed with a suitable supply of water for domestic purposes, the Great and General Court of Massachusetts created the Metropolitan District Water Supply Commission (Acts of 1926, Chapter 375 and Acts of 1927, Chapter 321). This Commission was directed to secure a supply of water to be distributed by the Metropolitan District Commission which absorbed the Metropolitan Water District, which was created by the Legislative Department of the Commonwealth of Massachusetts in 1895 (Acts of 1895, Chapter 488). The legislation creating and governing the Metropolitan Water District provided that towns and cities located in whole or in part within ten miles of the State House in addition to those named in the original Act could become members of the District for the purpose of receiving water supplies and other service from the District under conditions which varied to meet the situation.

We have reproduced and file herewith a map reproduced from Exhibit "D-13 AA," entitled "Cities and Towns with Expected Demand on Metropolitan District Water Supply," which shows:

1. Twenty cities and towns comprising the present Metropolitan Water District.

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2. Thirteen cities and towns eligible but not at present members of the District; Lynn and Saugus excepted.

3. Ten cities and towns just outside the ten mile limit of membership and not now eligible to become members of the District.

4. Twenty cities and towns further west which have rights in District sources of water supply but which are not eligible to become members of the District.

5. Eighteen cities and towns comprising the Ipswich group. (Colored orange.)

6. Thirty-seven cities and towns in Northeastern and Central Massachusetts not included in the other five groups. (Colored green.)

The Plate contains an explanatory key.

*Legislative Acts Authorizing Diversions include other Waters besides Ware and Swift Rivers*

By legislative act the Metropolitan District Water Supply Commission has been specifically directed for and on behalf of the Commonwealth of Massachusetts to take the waters of the Ware and Swift Rivers, which are normally a part of the watershed of the Connecticut River, and transport them for use in eastern Massachusetts into a different watershed which drains into the Atlantic Ocean. The amount to be taken from these two streams under the legislation will be sufficient to provide the people of eastern Massachusetts with about 205,000,000 gallons of water per day.

It was found by the Special Master (Page 5), that the Massachusetts acts do not authorize the diversion of any waters other than the Ware and Swift. The complainant has excepted to this finding (Exception 6 and 17), it being claimed that the act relating to the Swift River (Acts of 1927, Chap. 321) does permit other diversions with the exception of the Millers River.

Section 2 of that Act (Page 54 Reprint of Answer), provides:

> "The works authorized by this act shall be of such dimensions, capacities and areas as the commission may determine, and may from time to time be enlarged or modified as the commission may determine; and may be so constructed, enlarged or modified as to allow for a future increase in capacity to take care of the diversion of other streams in substantial accordance with the plans and recommendations of the joint board on water supply needs and resources of the commonwealth as contained in its report to the general court in nineteen hundred and twenty-two printed as house document fifteen hundred and fifty of that year; but nothing in this act shall be held to authorize any taking or diversion of any waters of the Millers river watershed or to affirm the intention of taking at any future date any unutilized flood waters of said Millers River."

Section 4 of the same act (Page 55, Reprint of Answer) provides:

> "Section 4. For any of the purposes of this act, or for the further protection of the purity of the waters to be diverted under this act, or for the purpose of providing for a future increase in the capacity of the Swift river reservoir, the commission on behalf of the commonwealth may, at any time and from time to time, take by eminent domain or acquire by purchase

or otherwise, such lands, waters, water rights, easements and other property or interests in property, including any cemetery, as it may deem necessary or desirable; provided, however, that the amount of water to be let down into the Swift river as provided in section one of this act shall not be diminished by any taking under this act."

*Legislative Acts concerning Construction of Works intend further Diversions*

Section 1 of the Ware River Act (Acts of 1926, Chap. 375), (Page 37 Reprint of Answer), provides:

"Said works, and particularly the aqueduct or tunnel required for said diversion, shall be constructed at such grade and of such capacity and otherwise so that they can be used as a part of works that shall later be constructed for diverting into the Wachusett reservoir the waters of the Swift river, in substantial accordance with the plans and recommendations of the joint board on water supply needs and resources of the commonwealth as contained in its report to the general court in the year nineteen hundred and twenty-two, printed as house document number fifteen hundred and fifty of said year. All plans, maps and records of said joint board relating to the proposed extension to the Ware, Swift and Millers rivers shall be made available to the commission, and the department of public health shall, at the expense of the commission, furnish it, on request, with any information relative to said projects that said department may have in its possession."

Also Section 2 of the Swift River Act (Acts of 1927, Chap. 321), (Pages 54 Reprint of Answer), quoted on the previous page makes provision for further diversion.

*Legislative reports concerning size and character of works*

The project and plan which is now being carried out was outlined generally in Exhibits "C-1" and "C-3," House Documents Nos. 1550 of 1922 and 500 of 1895, reports to the Great and General Court of the Commonwealth of Massachusetts by commissions appointed to study and decide upon a future policy for a water supply for the Metropolitan District. It is significant that the plan now being carried out had its inception as long ago as 1895 (Report of Special Master, p. 29).

In Ho. Doc. 500 of that year (1895), a plan was presented to the Great and General Court for a water supply for what is now the Metropolitan District. The plan was to take over the existing water supply of the City of Boston, coming from Lake Cochituate and the Sudbury River and supplement these by constructing an aqueduct (Wachusett aqueduct) westward from the Sudbury River to the Nashua River to bring the water of the Nashua to the Metropolitan District. A dam at Clinton, Mass., on the Nashua River to form a reservoir (Wachusett Reservoir) was part of the plan. This water supply from the Nashua River was expected to provide for a number of years in the future without any additional sources, but the report (Ho. Doc. 500, 1895, Ex. "C-3") looked ahead to the time when the safe capacity of the Nashua River supply should be exceeded, and at p. xvi comments thereon as follows:

> "The very great merit of the plan now submitted is to be found in the fact that this extension of the chain of the metropolitan water supplies to the valley of the Nashua *will settle forever the future water policy of the district*, for a comparatively inexpensive conduit can be constructed through to the valley of the Ware River, and beyond the Ware River lies the valley of the Swift; and, in a future so far distant that we do not venture to give a date to it, are portions of

> the Westfield and Deerfield rivers, capable, when united, of furnishing a supply of the best water for a municipality larger than any now found in the world." (Italics ours.)

This report transmits the report of the Chief Engineer of the State Board of Health from which we quote (Exhibit "C-3," p. 69-70):

> "The cost of adding the tributaries of the Assabet River and the Ware River will be comparatively small; and if the population of the Metropolitan District should ever become so large as to require the addition from time to time of the other streams, the cost would not be large in proportion to the greatly increased population to be supplied at the time."

A Joint Board, consisting of the State Department of Public Health and the Metropolitan District Commission, was authorized under the provisions of Chapter 49 of the Resolves of the year 1919, to make an investigation of the water supply needs and resources of the Commonwealth, with particular attention to those of the Metropolitan District, and in 1922 filed a report, Ho. Doc. 1550 (Exhibit "C-1"), which contained an elaboration of the plan suggested and recommended by the 1895 report (Report of Special Master, p. 29). This report comments upon the 1895 report as follows: (Exhibit "C-1," p. 16)

> "In 1895 chief reliance for the future supply of the district was placed upon the use of the Ware River, and after that, the Swift River. We believe that these ideas were sound, and our own recommendations are based upon them. Both of these sources of supply are sure to be needed. Two courses of action are open. One is to develop a supply from the Upper Ware River watershed, and later an independent supply from the Swift River, carrying both waters through separate tunnels to the Wachusett Reservoir. The other is to

> construct a single tunnel from the Wachusett Reservoir to the Swift River, crossing under the Ware River and so designed that it can be built in two installments, the first to take the Ware River supply, and the second to take both the Ware River and the Swift River. It is our opinion that the latter plan is much the better project, and it is the plan which we recommend."

Concerning the further diversion of tributaries of the Connecticut River, and its relation to the size of the works proposed, the Chief Engineer states at page 197 of Exhibit "C-1" the following:

> "The proposed reservoir in the Swift River valley, with a drainage area of 186 square miles and a storage capacity of 410,000,000,000 gallons, *would be open to the criticism that it was disproportionately large* to the size of its drainage area were it not for the fact that the plan contemplates the storage in this reservoir not only of the water of the Swift River, but also that from large areas in the watersheds of the Ware and Millers rivers in the earlier years, together with a possible subsequent extension to the Deerfield River and the addition of other areas as future circumstances may require." (Italics ours.)

The works of construction which the diversion of the Ware and Swift Rivers embodies are:

(1) A tunnel from the Ware River at Coldbrook eastward to the Wachusett Reservoir, 12 miles long, of horseshoe shape, 12 feet 9 inches high by 11 feet wide, having a cross section equivalent to the area of a circle with an internal diameter of 12 feet 9 inches, to be lined throughout with concrete, and having a daily capacity of 900,000,000 gallons. (Winsor, J. S. E.* 5.) A tunnel of 12 feet, 9 inches diameter was recommended in Ho. Doc. 1550 (Exhibit "C-1," p. 202).

* Joint Summary of Evidence.

(2) A diversion dam at Coldbrook on the Ware River to turn the water of this river into the tunnel (Winsor, J. S. E. 6).

(3) A continuation of this tunnel from the Ware River westward to the Swift River, a distance of approximately 10½ miles, of the same dimensions and capacity as that from the Ware River to the Wachusett Reservoir, making a total capacity of both tunnels of some 1,900,000,000 gallons a day. (Winsor, J. S. E. 5.)

(4) A temporary diversion dam in the valley of the Swift River before the main reservoir is built. This will permit diversion of Swift River water before construction of the main dams is finished and enable postponement of heavy expenditures on the main reservoir. (Winsor, J. S. E. 6, 7.)

(5) A reservoir in the valley of the Swift River made by the erection of two dams, one on the main stream and one on the side of the proposed reservoir, for the purpose of storing the Swift River water and the surplus Ware River water. The exact capacity of the reservoir has not been determined upon but three elevations of the dam and three corresponding capacities have been considered—first, a dam 500 feet above mean low water in Boston Harbor, having a capacity of 215,000,000,000 gallons—second, one at 515 feet, having a capacity of 318,000,000,000 gallons—and one at an elevation of 530 feet, having a capacity of 420,000,000,000 gallons. (Winsor, J. S. E. 8.) House Document 1550 (Massachusetts) of 1922, the plans and recommendations of which are to be carried out in the building of these works, recommended a reservoir of 410,000,000,000 gallons capacity.

(6) The acquisition by purchase or condemnation for reservoir purposes of approximately 90 square miles of land.

(Winsor, J. S. E. 9.) The area flooded by the reservoir, if built to the maximum height considered, would be 39 sq. mi. (Ex. "C-1," p. 197.)

(7) A power plant at the Wachusett end of the tunnel for the generation of hydro-electric power by the diverted water. (Winsor, Record, 199.) (Ex. "C-1," p. 206.) Exhibit "C-1" also points out (p. 206) that Ware and Swift Rivers water will augment the supply of power now available at the Wachusett dam and the Sudbury No. 5 dam. This power is now sold to public service corporations. (Winsor, Record, 199.)

The tunnel from the Wachusett Reservoir west to Coldbrook on the Ware River has a capacity of approximately 900,000,000 gallons per day and is of greater size than would be needed to carry away the water of the Ware River alone. This tunnel, as was suggested in Exhibit "C-1," and testified to, is large enough to take care of future diversions, not only from the Ware and Swift Rivers, but other rivers in the Connecticut watershed, including the Quaboag, Millers, Deerfield, Westfield and others. The reason for the building of these large tunnels, and the construction of this large storage reservoir on the Swift River, both so greatly in excess of what is required to adequately develop the Ware and Swift Rivers, is because the future water supply for eastern Massachusetts is to come from the Connecticut River watershed. This not only appears in the several reports from 1895 to the present time, but it was also testified to by the expert engineers called by the Commonwealth of Massachusetts who all agreed that the logical place for a future water supply to supplement the Ware and Swift would be the Connecticut River watershed. (Smith, J. S. E. 10; Fuller, J. S. E. 20; Winsor, J. S. E. 7.)

The extension of the tunnel from the Ware River to the Swift, about ten and one-half miles long, and substantially the same size as the tunnel now being constructed, will give a total tunnel capacity when built of 1,900 million gallons per day for Ware River water which can be diverted either east or west. While it appears that the actual size of the dam and reservoir to be constructed upon the Swift River has not been determined, it does appear that up to date, there has been purchased by the Commonwealth something over 35,000 acres of land, which is approximately 60% of what is contemplated to be acquired for reservoir purposes.

While in order to develop the waters of the Ware and Swift Rivers it would only require a storage capacity of about 140,000,000,000 gallons (Whitman, J. S. E. 12; Gregory, J. S. E. 13), there have been no plans considered by the Commonwealth which have provided for a storage capacity of less than 215,000,000,000 gallons, and the plans run from that figure up to a storage capacity of 420,000,000,000 gallons.

*Work so far accomplished*

1. *Ware-Wachusett Tunnel.* Dr. Winsor, the Chief Engineer of the Water Supply Commission, testified that the tunnel between the Wachusett Reservoir and Coldbrook on the Ware River is now under construction. The size is the same as recommended in House Document 1550 of 1922, Exhibit "C-1." It is being built entirely through rock and is to be lined throughout with concrete. (Joint Summary of Evidence, p. 5.) It is large enough to take care of additional water if in the future the freshet flows of further tributaries of the Connecticut River are diverted, and the possibility of taking such water in the future was one of the elements considered in the size of the tunnel, although the tunnel was designed primarily for

the purposes of the Ware-Swift project alone. (Joint Summary of Evidence, pp. 7 and 8.)

2. *The Ware River Dam.* A contract has been let for the construction of the dam and substructure for the Ware River intake works and work is in progress. Exhibit "D-29," p. 3 shows $125,155.21 as the estimated value of the work completed out of $273,077.00 estimated as the total cost of the contract.

3. *The Ware-Swift Tunnel.* No contracts have been let which are particularly applicable to this part of the plan. The Massachusetts legislation contemplates extending the tunnel from the Ware River to the Swift River, some 10½ miles (Winsor, Joint Summary of Evidence, p. 5).

4. *Temporary Swift River Diversion Dam.* It has not yet been decided whether this temporary diversion will be undertaken. (Winsor, Joint Summary of Evidence, p. 7.) The Massachusetts legislation authorized it. (Winsor, Joint Summary of Evidence, p. 6.) No contracts have been let which are particularly applicable to this part of the plan. (Ex. "D-29," p. 2.)

5. *Swift River Dam.* Contracts have been let for borings and aerial photographs for the Swift River supply. (Ex. "D-29," p. 2.) The estimated value of work done to date under these contracts is $34,598.26 and the estimated cost of the contracts when completed is $43,833.33.

6. *Purchase of Land.* For reservoir purposes on the Swift River something over 35,000 acres of land have already been acquired which is about 60% of what is contemplated for acquisition. The total amount of land which may be acquired will be practically 90 square miles. The area which will be

actually flooded according to the proposed flow line shown on Ex. "D-1" will be about 39 square miles with a dam at elevation 530 ft. (Joint Summary of Evidence, p. 9.)

The following amounts have been expended for real estate:

| | | |
|---|---|---|
| (Ex. "D-29," p. 1) | Swift Supply | $3,655,989.31 |
| | Ware " | 575,513.18 |
| | | $4,231,502.49 |

The estimated total cost of real estate, rights of way, business damages, water rights, diversion damages, etc., for the complete Ware-Swift project is $12,015,860 (Ex. D-6). The land already taken or to be taken for reservoir purposes in the Swift River valley is in the towns of Enfield, Dana, Greenwich, Prescott, Belchertown, Hardwick, Pelham, Petersham, New Salem, Shutesbury and Ware. (Reprint of Answer, p. 57.) The Metropolitan Water Supply Commission is proceeding under the Swift River Act. (Record, p. 21.)

> "Mr. Warren. Yes, and it is under those acts and only under those acts that this Commission is proceeding."

The land described for taking under the Massachusetts legislation is the same as is recommended in Ex. "C-1" (House Document 1550, Massachusetts, 1922, p. 198).

7. *Power Plant.* No contracts have been let which are particularly applicable to the power plant which is planned to be built at the Wachusett end of the Ware-Wachusett Tunnel, nor for the increased capacity in the existing power plants at the Wachusett Dam and the Sudbury No. 5 dam. (Winsor, Record, p. 200.)

> "Q. Could you tell us how much of a power plant you have in mind on this tunnel? A. I couldn't off

hand. The plans have not gone very far on the power plant itself, but we have some preliminary ideas of it."

8. *General.* Mr. Jacobs, an expert for the Complainant, testified that the tunnel already constructed to the Ware, the further one proposed to the Swift and the reservoir as outlined on Exhibit "D-1" all correspond with the recommendation contained in the Report of 1922 (Ex. "C-1") with no departure therefrom. (Joint Summary of Evidence, p. 12.)

Major Whitman, an expert witness for Complainant, testified that the works already constructed and planned are far beyond what is necessary for the development of the Ware and Swift Rivers in accordance with the legislation of 1926 (Chapter 375) and 1927 (Chapter 321) excepting where that legislation states that the works may be made big enough to take in other streams in the future. (Joint Summary of Evidence, p. 11.)

He further testified that he had made computations to show the amount of storage which would be required to develop all of the water of the Ware and Swift Rivers without permitting any water to continue to flow down the stream. He found that a reservoir of 140 billion gallons capacity would practically completely develop the watershed and the yield would be 270 million gallons per day. (Joint Summary of Evidence, p. 12.)

Dr. Gregory, an expert witness for Complainant, corroborated the statement that a total storage of 140 billion gallons in the Swift Reservoir would be all that is necessary to develop adequately the total water supply yield on the Ware and Swift Rivers, above the points of proposed diversions. (Joint Summary of Evidence, p. 12 and 13.)

Mr. J. Waldo Smith, Consulting Engineer for the present Water Supply Commission having charge of these works, who was the Consulting Engineer for the Joint Board of 1922 (Ex. "C-1") in the preparation of that report, testified that the reservoir and tunnels recommended by the Joint Board were to be built very ample in size and, if required at some later day, they would also take care of additions to that supply and the structures were designed to take care of more water than was immediately necessary. (Joint Summary of Evidence, p. 10.)

The total amount of money spent to March 1, 1930 on the Ware-Swift project is shown in Ex. "D-29," p. 1:

| | |
|---|---|
| Swift Supply ..... | $4,316,764.23 |
| Ware " ..... | 7,287,893.14 |
| Total spent to March 1, 1930 | $11,604,657.37 |

These expenditures have been made since this action has been pending and with full knowledge of its pendency. The contracts for the tunnel, amounting to about $9,000,000, were not let until the Spring of 1928 after the War Department had passed upon the Ware River application. (Winsor, Joint Summary of Evidence, p. 21.) Payments on the tunnel contracts amount to about $5,000,000 out of the $11,604,657.37 expended to March 1, 1930.

*Metropolitan District demand for water*

The legislation directs that upon the completion of the works authorized for the taking of the waters of the Ware and Swift Rivers, they shall be turned over to the Metropolitan District as a part of its water supply. (Reprint of Answer, p. 38, 54.) The Metropolitan Water District includes the city of Boston and any other city or town the whole or any part of which lies within a radius of ten miles of the State

House in Boston. There are now twenty cities and towns which are members of the District. In addition there are fifteen other towns eligible to become members of the District (Report of Special Master, p. 2), but which have not done so, and supply themselves with water from independent sources. The towns in this Metropolitan District have a present and will have a future water consumption (expressed in million gallons per day) as shown in the agreed statement on Page 159 of the Joint Summary of Evidence as follows:—

| | 1929 | 1970 | 2000 |
|---|---|---|---|
| 18 towns in Metropolitan District supplied with water ..... | 139 | ... | ... |
| 2 towns in District not supplied with water by the District ... | 8 | ... | ... |
| | 147 | 265 | ... |
| 15 towns eligible but not now in District ..... | 24 | 50 | ... |
| | 171 | 315 | ... |

To supply these present and anticipated future requirements, it was agreed by the Massachusetts witnesses that in these same towns the following amounts of water (expressed in million gallons per day) are now and will be available:

| | 1929 | 1970 | 2000 |
|---|---|---|---|
| 18 towns in Metropolitan District | 147 | 134 | 129 |
| 2 towns not supplied by the District ..... | 8 | 0 | ... |
| | 155 | 134 | 129 |
| 15 towns eligible ..... | 27 | 18 | ... |
| | 182 | 152 | 129 |

In addition thereto it is conceded that there is now *available but not developed* 70 million gallons per day in the

Ipswich River and 15 million gallons per day in the Assabet River, making a total of 85 million gallons per day additional to the supplies now developed and increasing the available supplies for the District as follows (J. S. E. 160, agreement) (Report of Special Master, p. 31):

| | 1929 | 1970 | 2000 |
|---|---|---|---|
| Now in use | 182 | 152 | 129 |
| Ipswich (undeveloped) | 70 | 70 | 70 |
| Assabet (undeveloped) | 15 | 15 | 0 |
| | 267 | 237 | 199 |

While the Ipswich and Assabet supplies are listed as *available but not developed*, there is no intention upon the part of Massachusetts to develop them but instead of so doing it is its intention to take the Ware and Swift Rivers from the Connecticut River watershed.

*Demand for Northeastern Massachusetts*

As the case progressed it appeared that while the legislation ostensibly provided a new source of water supply for the Metropolitan District, in reality this project was viewed as furnishing a water supply for all of northeastern Massachusetts not only until 1970 but until the year 2000. Chapter 375, Acts of 1926 Mass., states in Sec. 1 (Reprint of Answer, p. 37):

> "The Commission, on behalf of the Commonwealth, shall forthwith, for the purpose of extending and increasing the water supply of the Metropolitan Water System and *of such cities and towns not members of the Metropolitan water district as may hereafter require water from said system* . . . ." (Italics ours.)

The requirements and supplies of the present and future are set forth in full in the agreement (p. 159 and 160, Joint Summary of Evidence) as follows:

"It is agreed that the following table properly represents the total water consumption requirements in million gallons per day of northeastern Massachusetts in 1929, 1970 and 2000:

| | 1929 | 1970 | 2000 |
|---|---|---|---|
| 18 towns in Metropolitan District supplied with water | 139 | ... | ... |
| 2 towns in District not supplied with water by the District | 8 | ... | ... |
| Total | 147 | 265 | ... |
| 15 towns eligible but not now in District | 24 | 50 | ... |
| 10 towns just outside District | 4 | 8 | ... |
| 20 towns further west | 22 | 50 | ... |
| Total | 197 | 373 | 511 |
| 18 towns in Ipswich group | 22 | 47 | 70 |
| 37 other towns in potential group | 25 | 47 | 72 |
| Total | 244 | 467 | 653 |

"It is also agreed that the following table represents accurately the amount of water in million gallons per day which Massachusetts witnesses stated is available and will be available in the years 1929, 1970 and 2000, in northeastern Massachusetts, excluding from consideration the Ware and Swift supplies:

| | 1929 | 1970 | 2000 |
|---|---|---|---|
| 18 towns in Metropolitan District | 147 | 134 | 129 |
| 2 towns not supplied by the District | 8 | 0 | ... |
| Total | 155 | 134 | ... |
| 15 towns eligible | 27 | 18 | |
| 10 towns just outside | 4 | 0 | 35 |
| 20 towns further west | 22 | 20 | |
| Total | 208 | 172 | 164 |

| | | | |
|---|---|---|---|
| 18 towns Ipswich group ..... | 13 | 6 | 0 |
| 37 towns potential group ..... | 37 | 26 | 22 |
| Total ..... | 258 | 204 | 186 |
| Ipswich River (Hazen recommendation, not developed but available, as a supply) ..... | 70 | 70 | 70 |
| Assabet River (not developed but available as an emergency supply only) ..... | 15 | 15 | 0 |
| Total ..... | 343 | 289 | 256 |

"It is also agreed that the following table represents the amount of water in million gallons per day which witnesses for Connecticut state is now available for northeastern Massachusetts in addition to the supplies now developed by Massachusetts:

| | | | |
|---|---|---|---|
| 1. Fifteen Watershed Plan: | | | |
| A. Shawsheen-Ipswich development: | | | |
| 1. For Metropolitan District ..... | 78 | | |
| 2. Reserved for local sources ..... | 22 | | |
| | | | 100 |
| B. South Sudbury Filters (in addition to present supply) ..... | | | 17 |
| C. Lower Sudbury—Hobbs Brook ... | | | 27 |
| D. Assabet ..... | | | 35 |
| | | | 179 |
| 2. Merrimac River ..... | | | 200 |
| Total ..... | | | 379 |

The water available in the Merrimac is not limited to 200 million gallons per day but this figure was selected in order to

work out costs on a project comparable in yield to the Ware-Swift (Jacobs, J. S. E. 163). The supply from the Merrimac is unlimited (Jacobs, J. S. E. 168).

*Intention to abandon present sources of supply*

It will be noticed in the agreed statement concerning Massachusetts' claims of future available resources that the supply appears to decrease as the years go on. It appears that by 1970 some 54 million gallons per day will be abandoned (being the difference between 343 million gallons a day and 289 million gallons a day (Report of Special Master, p. 3) and by the year 2000 some 87 million gallons per day will have been abandoned (being the difference between 343 million gallons a day and 256 million gallons a day).

Dr. Winsor testified that he took into consideration the abandonment of the Cochituate supply first and the Ashland (part of South Sudbury) supply later. Also that his estimate of the future demand from northeastern Massachusetts practically included the abandonment of the supplies of the towns now supplying themselves, which are within the ten mile radius of the State House at Boston. "While he hadn't thought of it in just those terms, that is what it would amount to." (Joint Summary of Evidence, p. 14.)

*Sources available in eastern Massachusetts will not be used*

This agreed statement (Joint Summary of Evidence, pp. 159 and 160) shows that Massachusetts limits the sources which it considers available in the eastern part of the state to those now in use plus 85 million gallons per day which is *available but not developed* in the Ipswich and Assabet Rivers (Report of Special Master, p. 31). None of the other supplies listed or suggested by the Complainant's witnesses is considered as available for use although there appears to be more

than 379 million gallons per day available *if developed*. This amount is about twice the yield expected from the Ware and Swift development and will provide sufficient water to satisfy the demand far beyond the year 1970.

These supplies suggested by the Complainant include the supplies mentioned by Dr. Winsor (Joint Summary of Evidence, pp. 19 and 20), as described in the Hazen report (Ex. "C-2") as

> "There are, however, some available additions of substantial amounts which can be made to the present Metropolitan Water Supply from comparatively nearby sources which will render it possible to defer encroachment upon territory in the western portions of the State for a considerable period.
>
> Q. Now, Mr. Winsor, you heard that excerpt from page 40 read? A. I did.
>
> Q. Have any of those available additions of substantial amounts been developed since this report was made, in Eastern Massachusetts? A. No, not to my knowledge."

*Even with Ware and Swift development, the available supply will be insufficient before 1970*

Dr. Winsor testified (Joint Summary of Evidence, p. 13), that the Ware River Supply would last until the year 1934 providing it could be taken in 1931; that the supply from the temporary dam on the Swift River would suffice until perhaps 1941 or 1942 and that with the complete Ware-Swift development the capacity of all sources would be reached approximately by 1970.

Consequently it is now conceded that within 40 years northeastern Massachusetts will be faced with the same situation as it is to-day—the necessity of a further water supply.

This situation, of course, presupposes present conditions which the Special Master found may be expected to continue (Report of Special Master, p. 31). Supplies will be abandoned whenever it is deemed desirable. The waters of the state will continue to be increasingly polluted. Dr. Goodnough testified that the Merrimac and Connecticut Rivers were expressly exempted from the jurisdiction of the State Board of Health by legislation. (Joint Summary of Evidence, p. 218.) He also testified to the failure of the Commonwealth to clean up streams over which the Board of Health had jurisdiction. (Joint Summary of Evidence, pp. 220 and 221.)

Dr. Winsor testified that it would become necessary within ten or fifteen years before 1970 to plan and provide for an increased supply so as to be available by 1970. (Joint Summary of Evidence, pp. 14 and 16.) Consequently by 1955 or 1960 or within the next 25 years some source of supply must be provided for eastern Massachusetts.

*Future Supplies to come from the Connecticut Watershed.*

Both Major Whitman (Joint Summary of Evidence, p. 11) and Dr. Gregory (Joint Summary of Evidence, p. 13), testified that if the construction on the Ware and Swift Rivers as authorized in this legislation were carried out, then the logical place from which to provide the future water supplies of eastern Massachusetts would be other tributaries of the Connecticut River in view of the size of the tunnels and reservoir proposed to be constructed and that otherwise the construction would not be practical.

This is in keeping with the legislative reports on water supplies (Exhibit "C-1," and "C-3") which have been discussed in more detail elsewhere. One quotation from Exhibit "C-1" is worthy of repetition however, page 197:

> "The proposed reservoir in the Swift River valley, with a drainage area of 186 square miles and a storage capacity of 410,000,000,000 gallons, would be open

> to the criticism that it was disproportionately large to the size of its drainage area were it not for the fact that the plan contemplates the storage in this reservoir not only of the water of the Swift River, *but also that from large areas in the watersheds of the Ware and Millers Rivers in the earlier years, together with a possible subsequent extension to the Deerfield River and the addition of other areas as future circumstances may require.*" (Italics ours.)

The testimony of Dr. Winsor, Chief Engineer of the Metropolitan District Water Supply Commission is not so frank. (Joint Summary of Evidence, pp. 15-20.) At least it is evident from his testimony that no supply now existing in eastern Massachusetts is to be used and the sources which he mentions as an alternative to other tributaries of the Connecticut River watershed are more speculative than real.

In contrast to this statement we have that of J. Waldo Smith, the consulting engineer of the same Commission and the consulting engineer of the 1922 Joint Board (Exhibit "C-1"). He says (Joint Summary of Evidence, p. 11), "that the taking of water from other tributaries of the Connecticut River was not contemplated but was taken into consideration in 1922; that the other waters that *can be* put into the Swift River reservoir would be the Millers, Deerfield, Quaboag and Westfield and *that those are the ones that must be the next step in the development of the Ware and Swift.*"

The legislation (Acts of 1927, Chapter 321, Mass.) specifically provides (Page 54, Reprint of Answer):

> "The works authorized by this act .... may be so constructed .... as to allow for a future increase in capacity *to take care of the diversion of other streams* in substantial accordance with the plans and recommendations of the joint board on water supply

needs and resources of the commonwealth as contained in its report to the general court in 1922 printed as Ho. Doc. 1550 of that year." (Italics ours.)

*Legislation as to other diversions, size of works and expressed intention to use the Connecticut watershed for the future is material.*

We have already discussed in detail the legislation of Massachusetts as it specifically authorizes further diversions from streams in the Connecticut River watershed; the size and character of the works and structures recommended by the various reports of legislative committees and expert engineer advisers; the size and character of the works actually under construction by Massachusetts as well as those immediately contemplated; the announced intention in the reports to use the Connecticut River tributaries as a future water supply; and the opinions of both Connecticut and Massachusetts experts that, logically, the future supply will come from these sources.

As to these facts the Special Master states:

"I have disregarded entirely, because it seems to me immaterial, a large amount of testimony on another line. It was contended by Connecticut that the Ware and Swift scheme was simply an entering wedge to the drafting of added waters in the future from the Connecticut valley; and proof was offered of previous proposals in Massachusetts reports and documents to take water from the Millers River and other Connecticut tributaries. It was sought to prove that the tunnel from Wachusett to the Ware and beyond to the Swift was larger than necessary to carry the 191,000,000 gallons a day and that this must be for the purpose of taking added water in the future. I disregard such evidence altogether as it seems to me immaterial. The Massachusetts legislation confines itself to taking certain waters from the Ware and Swift. The Secretary of War has imposed additional limitations. Massachusetts says she intends to divert

> no more water than the Secretary of War permits and in every way to follow the conditions he imposes. It is true that counsel in this case cannot control the future action of Massachusetts. But it is sufficient for this case that injunction should not issue against something merely feared at some indefinite time in the future. Injunction issues to stop present injuries or those presently threatened. The judgment in this case if it goes in favor of Massachusetts, should settle her right to take only so much water and in such manner and at such times as the Secretary of War permits. It will in no way bar or diminish the right of Connecticut to proceed against the taking of additional future water. For this reason I disagree with the suggestion advanced by Connecticut on the hearing, that she is entitled at least to an injunction restraining Massachusetts from taking any more water than the Secretary of War has authorized. As there is no threat on the part of Massachusetts to do that, such an injunction does not seem to me proper." (Report of Special Master, p. 52, 53.)

This conclusion of the Special Master is attacked in Complainant's exceptions 5 and 19.

It was apparently the thought of the Master in deciding these questions that the comprehensiveness of the present works or structures so as to provide for the future addition of water from other streams from the Connecticut watershed was introduced solely for the purpose of anticipating future injury and to secure an injunction restraining anticipated acts of the Commonwealth of Massachusetts and that, in that sense, he found that the evidence was immaterial, because the actual injury was so remote as not to be the subject of present injunctive relief. This was not the purpose for which the evidence was introduced.

When we consider that it is the avowed intention of Massachusetts to procure a water supply which will be permanent

and adequate for an interminable future for the whole of Northeastern Massachusetts, it becomes of importance to know whether the supply for that section of the State now being sought from the Connecticut River watershed is to be a temporary or partial supply for this territory, or whether it is intended that the taking of the waters of the Ware and Swift Rivers is but the first step in the taking of the waters of other tributaries of the Connecticut River. It becomes of especial importance when it is shown that the additional takings of water are to come within a comparatively short period of time in the future.

We learn upon the best authority available, which is Dr. Winsor, the Chief Engineer of the Metropolitan District Water Supply Commission, that by 1955 or 1960, preparations must begin for the securing of additional waters beyond those of the Ware and Swift so that at least by 1970, a new supply must be provided. While it was seemingly impossible to obtain from Dr. Winsor any definite idea as to where these additional waters were to come from, it was very evident that he did not consider using any of the supplies of eastern Massachusetts, and all of the other witnesses both for Connecticut and Massachusetts conceded that with this construction now being carried on the logical source of supply in 1970 would be from other tributaries of the Connecticut River.

This phase of the case is also important if any consideration is to be given to the claim of Massachusetts that this Court is to advise the States of Connecticut and Massachusetts as to what proportion of the waters of the Connecticut River watershed are to be used by each state. It would hardly be fair to the Commonwealth of Massachusetts to permit it to continue the construction of these over-sized and elaborate works unless it could be reasonably assured that they can be used for the purposes for which they were designed and constructed.

If this case is to be taken out of the class of cases ordinarily cognizable by courts of law and equity and be placed in the class of those controversies or disputes which are to be settled by arbitration, and is to settle a basic policy as to the use of the waters of one great watershed by people residing in another and entirely different watershed, the real size of the project and the real intention and purpose underlying the present development should be considered.

*Present proposed taking on Ware and Swift Rivers*

Under the legislation of the Commonwealth of Massachusetts, it would have been possible to have diverted from the Connecticut River watershed approximately 205,000,000 gallons per day. This amount was to be taken, first from the Ware River where all of the flows in excess of 85,000,000 gallons per day were to be abstracted, and secondly, from the Swift River where all of the flows would be abstracted with the condition that at a point known as Bondsville, a flow of 20,000,000 gallons a day was to be maintained.

*Flood Flows not only Water Taken*

The legislation pertaining to the diversion of the waters of the Ware River (Acts of 1926, chapter 375, Mass.), (Reprint of Answer, page 37), confines these diversions to that of flood waters.

> "The commission .... shall .... divert into the Wachusett reservoir of said district the *flood waters,* as defined in section four, of the Ware River ...." (Italics ours.)
>
> Section 4. "For the purposes of this Act, the flood waters of the said Ware river which the commission is authorized to divert as provided in section one are hereby defined to be the waters thereof at and

> above the point of diversion established under section one in excess of a flow of eighty-five million gallons a day, meaning thereby, that on any day when the natural flow of said river is less than eighty-five million gallons no water shall be diverted."

Wherever the diversions from the Ware River are spoken of by Massachusetts representatives, said diversions are always referred to as, "the flood waters of the Ware River" (Reprint of Answer, pages 15, 23, 24 and 28). In discussing the Ware River diversions, the War Department referred to these as "excess waters" although in the communication from the Secretary of War, General Jadwin spoke of the "diversion of the flood waters exceeding 85,000,000 gallons per day." (Reprint of Answer, Appendix B, page 87.)

The ordinary definition of flood waters is:

> "An unusually abundant flow of water in a stream rising and overflowing land not commonly covered with water; an inundation, freshet or deluge; flood stage, the lowest stage of a river at which overflow will begin."

A flow of 85 million gallons per day from a drainage area of 100 square miles would not be considered flood waters except by special definition. (Joint Summary of Evidence, page 30.)

In the first place, there was no record of any floods in the Ware River overflowing the banks of that particular stream. Further, the lowest high flow of any year of record on the Ware River was 547 cubic feet per second in 1918 as compared to 85 million gallons per day, or 131 cubic feet per second as defined in the legislation. (Joint Summary of Evidence, page 29.)

Bouvier's Law Dictionary defines a flood as follows:

> "An inundation of water over land not usually covered by it. Such an accident is an Act of God. 4 Harr. Del. 449." (Baldwin's Cent. Ed., 425.)

This definition of floods has been followed generally by the courts as distinguished from the usual or ordinary flows which are confined to the banks of a stream.

> City of Tulsa *v.* Grier, 243 P. 753, 757; 114 Okl., 93.
> Thomson *v.* La Fetra, 183 P. 152; 180 Cal., 771.
> Herminghaus *v.* Southern California Edison Co., 252 P. 607, 610; 200 Cal., 81.
> City of Richmond *v.* Cheatwood, 107 S. E., 830, 833; 130 Va., 76.
> Soules *v.* Northern Pac. R. Company, 157 N. W., 823, 830, 34 N. D., 7, L. R. A., 1917A, 501.

The Special Master assumed, as indicated by the Ware River Act (1926 Ch. 375 Mass.), that the waters of this stream to be taken were flood waters. In Exceptions 1 and 20 the Complainant has objected to this fact. Actually the Act authorizes a diversion of all water over the amount needed for water power purposes in Massachusetts. (Winsor, Joint Summary of Evidence, p. 5.)

*War Department suggestions as to Ware and Swift Rivers*

Subsequent to applications to the Secretary of War for permission to make these diversions, The Metropolitan District Water Supply Commission was advised by the War Department, first in regard to the Ware River:

> "That no objection will be interposed by the War Department to the diversion of the flood waters of the Ware River exceeding 85,000,000 gallons per day for the period from *October 16 to June 15* each year." (Reprint of Answer, p. 88.) (Italics ours.)

This indicated a restriction virtually that no water may be diverted from the Ware River from June 16th to October 15th of each year, thus reducing somewhat the quantity of water which could be diverted under the legislation with permission of the State Department of Public Health.

In referring to the Swift River diversion, The Metropolitan District Water Supply Commission was advised by the War Department:

> "(b) The War Department is unwilling to admit that the appropriation of water from the Swift River to the extent proposed in this application might not, on occasion, have an appreciable effect on the navigable capacity of the Connecticut River." (Reprint of Answer, p. 101.)

After this finding, the communication from the War Department concludes that

> "limited amounts of water may be appropriated .... without substantially diminishing the navigability .... within the limits of present navigability." (Reprint of Answer, p. 101.)

and on the basis of this finding, placed a restriction during the period from June 1st to November 30th inclusive, that a flow of 70 cubic feet per second should be maintained on the Swift River when the discharge of the Connecticut River is less than 4,900 cubic feet per second (2.1 feet on the Hartford gauge), and more than 4,650 cubic feet per second, and further that a flow of 110 cubic feet per second shall be maintained when the flow of the Connecticut River at Sunderland is 4,650 cubic feet per second (2 ft. on the Hartford gauge) or less. This restriction further limited the quantity of water which might be diverted and also required letting down certain quantities of water from storage.

The net effect of these restrictions was to reduce the quantity of water which Massachusetts could divert under its legislation as restricted by the War Department from 205,000,000 gallons per day to 191,000,000 gallons per day (Report of Special Master, p. 5), or a reduction of 14,000,000 gallons a day. From this will be seen the importance of such an amount of water as 14,000,000 gallons a day when it changes the conditions sufficiently to warrant the Secretary of War from being unwilling to admit that 205,000,000 gallons a day might not have an *appreciable effect on navigable capacity* to the finding that *no substantial alteration* or modification of the navigble capacity of the channel would be effected if 191,000,000 gallons a day were taken under the regulations imposed.

*Taking from two streams is determinable*

The mean annual discharge of the Connecticut River at the Massachusetts-Connecticut state line is 17,000 cubic feet per second (Report of Special Master, p. 4). The average net diversion from both the Ware and Swift Rivers under the War Department's restrictions is 2 per cent of the mean annual discharge of the Connecticut River. (Joint Summary of Evidence, page 3.) (Report of Special Master, p. 5.)

It is claimed in Exception 2 that the Special Master should have found that these diversions were determinable. This seemed especially important in view of the affirmative allegation of the defendant that the diversions were not measurable nor determinable. (Reprint of Answer, p. 18.)

*Suggestions of the War Department have never been reported to, nor accepted by the legislature of Massachusetts*

Chapter 375 of the Acts of 1926 and Chapter 321 of the Acts of 1927 under which Massachusetts is proceeding with the constructions necessary to accomplish the contemplated diversion provide for the diversion of certain waters of the Ware

River, said waters being defined as those waters in excess of a flow of 85,000,000 gallons per day, and for the diversion of the flow of the Swift River except on such days as the flow of the Swift River at Bondsville is less than 20,000,000 gallons. These definite provisions as contained in the Massachusetts legislation were the subject of certain suggestions by the War Department. The Department stated that no objection would be interposed to the use of the waters of the Ware River in excess of 85,000,000 gallons per day, for the period October 16 to June 15 each year, and as regards the Swift River, indicated its unwillingness to admit that the appropriation of the water provided for in the legislation might not have an appreciable effect on the navigable capacity of the Connecticut River.

The suggestions of the Secretary of War were duly received by the State of Massachusetts and set up as an appendix in their reprint of answer (p. 84, 92). However, they have not been made the subject of any report to the Great and General Court of Massachusetts and it has taken no action to modify the original legislation. Dr. Winsor, Chief Engineer of the Metropolitan District Water Supply Commission, testified (J. S. E., p. 9) that he is not able to say whether any change in the legislation is contemplated, and that so far as he is concerned he knows of no report to the legislature embodying the suggestions made by the Secretary of War nor of any to be made.

*Decree in this case should limit the diversion at least to the restrictions suggested by the Secretary of War*

This material refers to Exceptions 7, 8, 18, and 23

The Special Master on page 53 takes up this subject in the following manner:

> "The Massachusetts legislation confines itself to taking certain waters from the Ware and Swift. The Secretary of War has imposed additional limitations,

> Massachusetts says she intends to divert no more water than the Secretary of War permits and in every way to follow the conditions he imposes. It is true that counsel in this case cannot control the future action of Massachusetts. But it is sufficient for this case to say that injunction should not issue against something merely feared at some indefinite time in the future. Injunction issues to stop present injuries or those presently threatened. *The Judgment in this case, if it goes in favor of Massachusetts, should settle her right to take only so much water and in such manner and at such times as the Secretary of War permits.* It will in no way bar or diminish the right of Connecticut to proceed against the taking of additional future water. *For this reason I disagree with the suggestion advanced by Connecticut on the hearing, that she is entitled at least to an injunction restraining Massachusetts from taking any more water than the Secretary of War has authorized.* As there is no threat on the part of Massachusetts to do that such an injunction does not seem to me proper." (Italics ours.)

The Special Master proceeded throughout his report to find many material facts on the assumption that Massachusetts would restrict herself to the suggestions and limitations placed upon the project as outlined in the Massachusetts legislation. This assumption is wholly unjustified.

No indication appears in the entire record in this case that the State of Massachusetts intends to restrict itself to the suggestions laid down by the War Department, and indeed, it has been the claim of the Commonwealth that the War Department had no jurisdiction over the diversion, and it was only during the trial of the case that counsel for Massachusetts, in answer to a question by the Special Master, stated that so far as counsel could bind the State of Massachusetts, it was the intention of the Commonwealth to take only such water as the Secretary of War permitted.

Massachusetts has neither accepted these recommendations in any official manner whatsoever, nor have they been acted upon by the Metropolitan District Water Supply Commission.

The testimony as to damage was largely confined by the Complainant State to the damage that would ensue upon the putting into effect of Massachusetts legislation, or upon the putting into effect of that legislation as limited by the War Department. The Secretary of War has of necessity no interest whatsoever in the flow of the Connecticut River except insofar as the navigable capacity of that stream is affected.

There is no guarantee to the State of Connecticut that the amount of water that the War Department considers necessary to maintain navigation on the river to-day may not be considered excessive by that same Department to-morrow. The War Department may then remove the restrictions placed on the project. Such a removal of restrictions would inevitably result in increased damage to the Complainant State in respect to agriculture, power capacity of the stream, polluted condition of the stream and in all of the other features complained of.

In the event that this Court should see fit to enter a decree in favor of Massachusetts, the only safeguard which the State of Connecticut and its citizens would have against the imposition of such an increased damage would be an injunction from this Court in connection with that decree restraining the State of Massachusetts forever from increasing its diversion to an amount in excess of what the Secretary of War has already indicated would, in his opinion, cause no damage to navigation on the stream. To allow, as the Master suggests, the abstraction of water only in such quantities and at such times as the Secretary of War permits would be not only uncertain but would be unfair to the Complainant State inas-

much as such a decree would give no consideration whatsoever to the various other valuable property rights within the State of Connecticut which are being damaged.

*Diversions will reduce flow of Connecticut River at all stages either with or without War Department suggestions*

It is significant that from the standpoint of navigation alone, the question of *time when* the diversion takes place may be even more important than the *quantity* of water which is taken. Congress has fixed a project depth for the Connecticut River of 12 feet, equivalent to 2 feet on the Hartford gauge. (Joint Summary of Evidence, page 29.) (Report of Special Master is in error at page 5 and 13 with respect to this.) It will be seen from Paragraph (d) of the communication from the War Department (Reprint of Answer, page 102), that this 2 feet seems to have been the controlling depth for the release of waters from the Swift Rivers; release starting when the gauge is 2.1 feet at Hartford and the quantity of water to be released increasing when the gauge reaches the project depth of 2 feet. Because of the time element involved in the travel of water from the Swift River to Hartford, the gauge at Sunderland, Mass., which is approximately the same distance from Hartford as the point of diversion on the Swift River, was used as the guide in determining the time when water should be released. It was found that when the flow at Sunderland was 4,650 cubic feet per second, that the average lower lowtide gauge height at Hartford was 2.0 feet. (Reprint of Answer, page 102.) The record shows that when the gauge at Hartford is 2 feet, the average flow of the Connecticut River at that point is 5,200 cubic feet per second, Exhibit "C-25-A." (Joint Summary of Evidence, page 35.) The difference between the flow at these points must come from the natural flow from the drainage area lying between Hartford, Conn. and Sunderland, Mass. which area includes the valleys of the Ware and Swift Rivers. If it were a fact

that the flow of water into a stream is the same for each square mile of drainage area, then average conditions would be of importance, but actual experience shows that when the flow of water from one part of the drainage area is low, that the flow from other parts may be quite high, so that while under average conditions it was intended that the restrictions of the Secretary of War would improve conditions on the River, or at least, maintain them equal to what the conditions were before the diversions, at times when the Hartford gauge was 2 feet or less, yet the intention is not carried out. Had average conditions prevailed, the calculations as shown in Complainant's Exhibits "25-A" and "25-B" would hold; namely, that when the Hartford gauge was 2 feet, the proposed diversions would lower the gauge from .01 to .02-foot under the Massachusetts legislation, and the gauge would be raised from .01 to .02 of a foot under the restrictions of the Secretary of War. But such average conditions do not prevail. This was shown by Complainant's Exhibit "C-41," based on the years 1914 to 1927 which Exhibit was supplemented and corroborated by Defendant's Exhibit "D-36," which included all of the years from 1913 to 1929 inclusive. This showed that the gauge at Hartford is two feet or less for more than two months of the year—about 67 days in Complainant's Exhibit "C-41," and about 72 days in Defendant's Exhibit "D-36." On the other hand the number of days when water would be released in excess of the natural flow of the Swift River under the Army restrictions, would be 37 days according to Complainant's Exhibit "C-41," and 43 days according to Defendant's Exhibit "D-36," leaving in both cases 29 days a year or practically one month when the Hartford gauge will be 2 feet or less, and diversions will be permitted from the Swift River, because the natural flow of the Swift River was in excess of the water released as required under the restrictions of the Secretary of War, and on these days the gauge at Hartford would have been reduced as much as 2½ inches as shown by Complainant's Exhibit "C-41." This shows the

wide variations which take place due to the difference in stream flows on different parts of the watershed of the same stream. While it was contemplated under average conditions, as shown in Complainant's Exhibit "C-25," that the diversions under the Massachusetts legislation would have reduced the Hartford gauge .02 of a foot or less when the stage was 2 feet or less, yet as shown on Page 3 of Complainant's Exhibit "C-41," the reductions were as high as .25 of a foot, or 3 inches, over ten times the average reduction that was expected on the basis of averages, and this shows even in greater contrast when the average increase from .01 to .02 of a foot, which was to be expected under the restrictions of the Secretary of War as shown in Complainant's Exhibit "C-25-B" actually would have resulted in decreases as much as 0.2 of a foot or 2½ inches. During a large portion of the year, the stage of the river is only at 2 feet on the gauge or below, and during practically 40% of the days when the river stage at Hartford is 2 feet or less, diversions will be taking place, lowering the stage of the river as measured by the gauge at Hartford.

While the project authorized by Congress for Navigation from Hartford to Long Island Sound is based on a project depth of 12 feet, which is equivalent to 2 feet on the Hartford gauge, yet the record shows that there has never been sufficient work done under the appropriations of Congress to maintain the river at such a depth at all times and that in spite of the amount of dredging that is being done, navigation requires not a gauge height of 2 feet, but a gauge height of from 3 to 4 feet in order that barges and steamers can freely pass up and down the river. In the judgment of the mariners who testified in this case no water can be spared, not only when the gauge is 2 feet or lower, but also during the time when the gauge is between 2 and 4 feet. According to Complainant's Exhibit "C-25," this is about 37% of the time, or 135 days a year. Either under the Massachusetts legislation or under the

restrictions of the Secretary of War, diversions would take place so as to reduce the gauge height at Hartford on an average of .04 of a foot. This is about twice the average reduction which was expected at 2 feet under the Massachusetts regulations. With increasing gauge height in general, there will be increasing diversions. These are set forth for each foot in Complainant's Exhibit "C-25," showing the effect up to a point of 12 feet on the Hartford gauge at which times the reduction would be on an average approximately 3 inches.

It will be observed that the gauge is 12 feet or less 93% of the time, or 339 days a year, leaving 26 days when the river is above 12 feet. The flood stage in the Connecticut River is considered as 16 feet, the flood stages from 1913 to 1926 inclusive are shown graphically in Complainant's Exhibit "C-6," "C-6A" and "C-6B." These Exhibits show further the reduction which would have taken place in flood heights under the Mass. legislation and also under the modifications of the Secretary of War. During this period of 14 years, there were 178 days or an average of 13 days a year when the river was in flood as indicated by the Hartford gauge. On these days, the reduction in gauge height would have been as much as 6½ inches.

Because of these facts the Complainant excepted to the Special Master's Report as set forth in Exceptions 3 and 4.

*The use of flowing water is a real property right*

The Special Master erred and mistook the law in refusing to hold that the right to all flowing waters including flood waters is a property right protected under the Constitutions of the United States, the State of Connecticut, and the Commonwealth of Massachusetts. (Exception 22.) While there may be no ownership in flowing waters as such, the rights which

pertain to flowing waters are wholly derived from the ownership of land along the banks of the stream through which the water flows. The ownership of these lands carries with it, as an incident of such ownership, the right to use, in common with all other riparian owners along the stream, these flowing waters for certain purposes. The use to be made of these waters by any one riparian owner must be of such a character as to be consistent with a like use by all other riparian owners.

King *v.* Tiffany, 9 Conn., 162, 168.
Pratt *v.* Lamson, 84 Mass., 275.
Moulton *v.* Newburyport Water Co., 137 Mass., 163.

*Such use is a vested property right*

The use of flowing waters, existing solely because it is an incident to ownership of real estate along the banks of the stream, constitutes such a right a vested property right. It is known as an usufruct. The right is a right in real estate.

Hollister *v.* Union Co., 9 Conn., 435, 443.
Johnson *v.* Jordan, 43 Mass., 234, 239.
Cary *v.* Daniels, 46 Mass., 236, 238.

*Includes flood waters*

The right to use the waters of a flowing stream is applicable to all the water which nature supplies in the stream. It is not limited to the amount of water which flows in the stream in any one season of the year or any one year or an average of a number of years. Whether it be during periods of low flow or periods of high flow, commonly known as flood water, or an intermediate flow, a riparian owner is entitled to use of all of them. In Connecticut, flood waters occupy in its judicial decisions a class by themselves; and the Supreme Court of Connecticut has specifically said that a riparian owner is entitled to these flood waters to the same extent to which he is entitled to the use of any other flows of the stream.

Thompson *v.* New Haven Water Co., 86 Conn., 597.

In Massachusetts, while this distinction is not so marked, the courts have held that the flow of the stream to which riparian owners are entitled includes all of the waters flowing by nature, including the flood waters.

Nemasket Mills *v.* Taunton, 166 Mass., 540, 544.

*Extent of rights*

*Unimpaired as to Quantity and uncontaminated as to Quality*

The general rule of the common law states that a riparian owner is entitled to the use of flowing waters as they are wont to flow; that these waters must come to him and must be released by him after use unimpaired as to quantity and uncontaminated as to quality.

King *v.* Tiffany, 9 Conn., 162.
Buddington *v.* Bradley, 10 Conn., 212.
Wadsworth *v.* Tillotson, 15 Conn., 365.
Agawam Canal Co. *v.* Edward, 36 Conn., 476.
Waterbury *v.* Platt Bros. Co., 76 Conn., 435.
Colburn *v.* Richards, 13 Mass., 422.
Anthony *v.* Lapham, 22 Mass., 175.
Johnson *v.* Jordan, 43 Mass., 234.
Elliott *v.* Fitchburg R. R. Co., 64 Mass., 191, 196.

*Reasonable use*

The rights of riparian owners to use the waters of a flowing stream are limited to such use as will permit of a like use by all other riparian owners along the stream. They include, as a right, the use of the water for watering his cattle, and for a domestic supply for his household, and to a limited extent for the irrigation of his land.

*Use for municipal water supply a non-riparian use*

The use of water for domestic purposes by a municipality, even where the municipality is a riparian owner, and located upon the banks of a flowing stream, has never been recognized in either the State of Connecticut or the Commonwealth of Massachusetts as a reasonable use of such waters. From the earliest times the right of a municipality to use the waters of flowing streams for such purposes has been granted by legislative acts, and provisions made for compensation to be paid by the municipalities to riparian owners along the stream.

Harding *v.* Stamford Water Co., 41 Conn., 91.
Moulton *v.* Newburyport Water Co., 137 Mass., 163.
Proprietors of Mills on Monatequot River *v.* Braintree Water Supply Co., 149 Mass., 478, 486.
Stevens *v.* Worcester, 219 Mass., 128.

*Taking waters for non-riparian use must be by eminent domain*

If any riparian owner desires to use flowing waters for purposes other than those usually considered a riparian use, he must either acquire those rights to make such further use of the waters by securing deeds or grants from all other riparian owners having an equal right with him to their use, or else he must obtain from the state the power to take the rights of such other riparian owners. In order to acquire this right, the use which he intends to make of the waters must be a public use, for this is the only ground upon which the state can grant the right to take private property; and provision must also be made for the payment of just compensation. It is because the legislative department has recognized the public necessity of developing manufacturing and furnishing a water supply which is adequate to centers of population, that it has authorized, sometimes in specific instances and sometimes by general act, the taking of water for purposes of millwrights, manufacturing plants, and municipal water supply. This has

all been accomplished through legislative act, authorizing the taking upon the payment of just compensation; and we can find no cases which authorize the use of water for these purposes without such legislative authority.

Ætna Mills *v.* Brookline, 127 Mass., 69, 71, 72.
Ætna Mills *v.* Waltham, 126 Mass., 422, 425.
Lynfield *v.* Peabody, 219 Mass., 322.

We cannot quarrel with the general statement that each riparian owner is entitled to a reasonable and just use of the water on its course through his land; and the cases cited are ample to sustain the general proposition; but an examination of all the cases cited fails to disclose any one of them in which the use of water for a domestic supply of a municipality has been sustained. Perhaps the nearest approach to this question is the Case of *Stratton v. Mt. Hermon Boys' School*, 216 Mass., 83, 85, in which the waters of a stream, without legislative act, were diverted for the purpose of supplying a boys' school with water. Of course this school would consume much less water than any ordinary town or city, and its use was probably necessary for the satisfactory maintenance of the institution; but the court found that such use was not a reasonable one and awarded substantial compensation to the plaintiff.

*Sovereign must consent to taking*

Sovereign rights can only be divested by the voluntary act of the sovereign. This may be accomplished in a number of different ways under our form of government. So far as powers have been delegated to the United States, such rights as are necessary to carry into effect such powers have been transferred to the United States by the States. The ratification of the Constitution effected the transfer. It was the voluntary act of the sovereign power of each State. Such act was that of the legislative branch of the government. It is the legislative branch which today must approve of all amendments to the

Constitution which may seek to delegate further powers to the federal government.

The legislature of a state may also by appropriate action, enter into agreement or compact with another state. But this agreement or compact must be approved by the legislatures of the states involved and by the legislative branch of the United States government. In no case is there any intimation that any department other than the legislative can so act.

In *Hudson Water Company v. McCarter*, 209 U. S., 349, it was said:

> "But is it recognized that the state, as quasi-sovereign and representative of the interests of the public has a standing in court to protect the atmosphere and the water and the forests within its territory, irrespective of the assent or dissent of the private owners of the land most immediately concerned."

And further—

> "It finds itself in possession of what all admit to be a great public good; and what it has it may keep and give no one a reason for its will."

In *Georgia v. Tennessee Copper Co.*, 206 U. S., 230, this is said:

> "This is a suit by a state for injury to it in its capacity of quasi-sovereign. In that capacity the state has an interest independent of and behind the titles of its citizens, in all the earth and air within its domain."

And in *Kansas v. Colorado*, 206 U. S., 46:

> "One cardinal rule underlying all the relations of the states to each other is that of equality of right. Each state stands on the same level with all the rest. It can impose its own legislation on no one of the others, and is bound to yield its own views to none."

*The common law rule as to riparian ownership is effective in both Connecticut and Massachusetts*

The Complainant contends that where both States have adopted the common rule of riparian rights the Supreme Court of the United States has no function but to apply the rule of the common law in force in both States in the determination of a controversy between the two States.

In the case of *Stratton v. Mt. Hermon Boys' School*, 216 Mass., 83, the Court discussed the question of the use of water outside the watershed, and stated

> "There can be no recovery for a diversion of water for a proper use, so small in quantity and of such a character that it occasions no injury to the present or future use of the lower riparian land . . . . Nor is this inconsistent with the decisions which hold that there may be recovery even though there is no present actual damage, provided an injurious effect may be produced upon the lower estate by the acquirement of right through the lapse of time." (Stimson *v.* Brookline, 197 Mass., 568; Newhall *v.* Ireson, 54 American Decisions, 790; Lond *v.* New Bedford, 121 Mass., 286; Ware *v.* Allen, 140 Mass., 513.)

> "The distinction is between a diversion which causes a present or potential injury to the lower estate for a valuable use, *and one which cannot produce such a result.*" (Italics are ours.)

Colburn *v.* Richards, 13 Mass., 422.
Anthony *v.* Lapham, 22 Mass., 175.
Johnson *v.* Jordan, 43 Mass., 234.
Elliott *v.* Fitchburg R. R. Co., 64 Mass., 191, 196.
King *v.* Tiffany, 9 Conn., 162.
Buddington *v.* Bradley, 10 Conn., 212.
Wadsworth *v.* Tillotson, 15 Conn., 365.
Agawam Canal Co., *v.* Edward, 36 Conn., 476.
Waterbury *v.* Platt Bros. Co., 76 Conn., 435.

"Under the doctrine of the common law as to riparian rights, a riparian owner does not have the right to divert the water of the stream for use on non-riparian land." (2 Farnham on Waters and Water Rights, Section 497.)

"It is not necessary to allege or prove specific damage in either Connecticut or Massachusetts in order to obtain relief against the invasion of a right in or to a flowing water." (*Wellington v. Rawson*, 231 Mass., 189; *Water Commissioners v. Perry*, 69 Conn., 461.)

"The first contention of the defendant is that the bill does not state a case for equitable relief because there is no allegation of damages . . . . . It is not essential to allege that the plaintiff suffered damage by the acts of the defendant. The plaintiff's right was invaded. In such a case no special damage, no actual, pecuniary loss need be stated or proved. The law presumes that a party sustains some damage from the infringement of his right and enables to maintain an action whether he has suffered actual damage or not." (*Atkins v. Boardman, Mass.*, 37, *American Decisions*, 100; *Wellington v. Rawson*, 231 Mass., 189.)

*The law of the two states governs an action between them and no new rule of law can be imposed upon them or either of them*

On page 7 of the Report of the Special Master, the following statement is made:

"I think equally unsound is the contention that the Supreme Court in a suit between two states which recognize the common law is confined to rules sanctioned by common law."

and in support of his contention the Special Master cites *Kansas v. Colorado*, 206 U. S., 46, and *Wyoming v. Colorado*, 259 U. S., 419.

The Complainant excepted to this finding (Exceptions 10, 11, and 13) because it is claimed that when a rule of law obtains in each of two states that rule should be followed in a justiciable controversy between them.

In the case of *Kansas v. Colorado*, 206 U. S., 46, although the Court covered a great deal of ground in a general discussion of the powers of this Court in cases of this character, the real decision of the case is based upon the statement that—

> "As Kansas thus recognizes the right of appropriating the waters of a stream for purposes of irrigation, subject to the condition of an equitable division between the riparian proprietors, she cannot complain if the same rule is administered between herself and a sister state."

In other words, the Court, having found that Kansas recognized the rule of appropriation of waters, and Colorado enforced a like rule, that this common rule should be adopted by this Court as the rule for determining the issues between the two states.

The case of *Wyoming v. Colorado*, which the Special Master cites was a controversy between two states which concededly were prior appropriation states and the Supreme Court applied the prior appropriation rule with great strictness even to the point of deciding how many acre-feet of water Wyoming had appropriated, and the Court goes on to say at page 496:

> "the amount covered by senior appropriations in Wyoming is 272,500 acre-feet, there remain 15,500 acre-feet which are subject to this junior appropriation in Colorado .... A decree will accordingly be entered enjoining the defendants from diverting or taking more than 15,500 acre-feet per year from the Laramie River...."

The foregoing is an unequivocal application of the prior appropriation rule which obtained in each of the two states.

> "Turning to the decisions of the courts of last resort in the two states, we learn that the same doctrine respecting the diversion and use of the waters of natural streams has prevailed in both from the beginning, and that each state attributes much of her development and prosperity to the practical operation of this doctrine. The relevant views of the origin and nature of the doctrine, as shown in these decisions, may be summarized as follows: The common law rule respecting riparian rights in flowing water never obtained in either state. It always was deemed inapplicable to their situation and climatic conditions." (*Wyoming v. Colorado*, 259 U. S., 458, 459.)

The common law doctrine of riparian rights has been applied by all the courts, including the courts of last resort in both the State of Connecticut and the Commonwealth of Massachusetts.

> Colburn *v.* Richards, 13 Mass., 422.
> Anthony *v.* Lapham, 22 Mass., 175.
> Johnson *v.* Jordan, 43 Mass., 234.
> Elliott *v.* Fitchburg R. R. Co., 64 Mass., 191, 196.
> King *v.* Tiffany, 9 Conn., 162.
> Buddington *v.* Bradley, 10 Conn., 212.
> Wadsworth *v.* Tillotson, 15 Conn., 365.
> Agawam Canal Co. *v.* Edward, 36 Conn., 476.
> Waterbury *v.* Platt Bros. Co., 76 Conn., 435.

In the case of *Kansas v. Colorado*, 206 U. S., 46, 95, this Court stated: "In other words through these successive disputes and decisions this Court is practically building up what may be not improperly called Interstate Common Law."

The definition of common law, as stated by Blackstone in his Commentary, is that it is a rule of conduct which has existed since the memory of man runneth not to the contrary.

This of course, cannot mean that a new principle of law may be injected as common law by either state, or as applicable to controversies between the states, but must necessarily be the result of a long continued practice acquiesced in by substantially all those interested in the subject of the controversy.

If there is one common law rule which has been consistently followed by this court for a length of time sufficient to be denominated interstate common law, it is the rule that where this Court determines the laws of the states involved in the controversy to be substantially the same, this is the law which is followed by this Court in the particular case before it.

In *3 Enc. U. S. Reports*, page 970, it is stated:

> "There is no common law of the United States, in the sense of a national customary law, distinct from the common law of England as adopted by the several states, each for itself, applied as its local law, and subject to such alteration as may be provided by its own statutes; but general common law exists throughout the United States, not, it is true, as a body of law distinct from the common law in force in the states, but as containing the general rules and principles by which all transactions are controlled, except so far as those rules and principles are set aside by express statute. Hence, when a common law right is asserted, the laws of the state in which the controversy originated must be looked to."

In those cases which have come before this Court concerning boundary lines between states, the sole question before the Court has been the determination of the proper boundary line between the two states involved. There has been no difference between the action of this Court in determining the boundary line between two states, and the courts of any one of the states in determining the boundary line between the property of two of its citizens. No attempt has been made to divest either state

of property to which it was entitled and to give it to the other. It has simply been a question of determining the true line.

This was illustrated in the case of *Louisiana v. Mississippi*, 202 U. S., 1, where the Court said:

> "The islands, marsh or otherwise, claimed by Louisiana in this case, were all within three leagues of her coast. The act admitting Mississippi was passed five years after the Louisiana Act, yet Mississippi claims thereunder the disputed territory as being islands within eighteen miles of her shore. If it were true that this repugnancy between the two Acts existed, it is enough to say that Congress, after the admission of Louisiana, could not take away any portion of that state and give it to the state of Mississippi."

The fundamental principle in this case is no different than where one property owner has acquired property by deed and his neighbor thereafter has acquired a portion of the same property from the same grantor. The court, in such a case, would necessarily be bound to apply the rule that the grantor exhausted his powers of alienation when he made the first grant, and that the property of the first grantee could not be taken away and awarded to the second grantee.

In the case of *Wisconsin v. The State of Illinois and the Sanitary District of Chicago*, 278 U. S., 367, all of the Lake States, so-called, and the State of Illinois were common law riparian ownership states. According to the claims of the Lake States, as set forth in substance in the reported opinion of this case, they asserted that as riparian owners, and as representatives of their people that they were entitled to the waters of the Great Lakes as nature provided them; and that the State of Illinois and the Sanitary District of Chicago had no right to divert any of these waters for municipal purposes of the Sanitary District.

They further claimed that no legal authority was conferred by the legislative act of the State of Illinois authorizing the diversion. To protect the Lake States against this diversion an injunction was granted by this Court as prayed for. It is apparent from the digest of claims, as they appear in the reported decision, of both the Lake States and the State of Illinois and the Sanitary District of Chicago, that these states were at issue as to the rights of the respective states to establish and enforce the common law doctrine of riparian ownership within their own borders. To have granted the injunction prayed for in this case, it was necessary for this Court, having found that the federal authority was insufficient as a legal basis for the diversion, to have come to the conclusion that the claims of the Lake States were correct, and that no authority was vested, either in the State of Illinois or in any other place or in this Court, to authorize or permit a diversion of the waters of the Great Lakes as against the objections of the Lake States.

From the above it is evident that this Court will apply in a suit between the two states the law of the states rather than a rule of its own. In overruling the Complainant's claim to this effect the Special Master erred.

Both Massachusetts and Connecticut adhere to common law and this has been conceded for the purpose of this case in the answer to the bill of Complainant (Reprint of Answer, page 5), from which we quote: "And further answering the defendant says, that by the law both of the Commonwealth of Massachusetts and of the State of Connecticut owners of riparian lands are entitled to make reasonable and equitable use of the waters of the streams flowing by or through their land providing that such use is not inconsistent with a similar reasonable and equitable use of the said streams by lower riparian owners."

*Massachusetts has not changed this rule*

The Special Master held that

> "Massachusetts has a right to change her common law, and by the legislation in question, so far as her power extends, she has legalized the proposed diversion. I think it cannot be maintained that Connecticut has any vested right to insist that Massachusetts must continue common law rules as originally introduced from England." (Report of Special Master, page 10.)

In this finding the Special Master erred and mistook the law in holding that the Commonwealth of Massachusetts had adopted any system of law which will permit the diversion of any water from its streams except by the consent of all riparian owners or by a taking under legislative authority for a public use. (Exceptions 15 and 16.)

The statutes under which the State of Massachusetts is proceeding are the Acts of 1926, Chapter 375, and the Acts of 1927, Chapter 321, and these statutes provide for the establishment of a special Metropolitan District Water Supply Commission for the diversion of waters of the Ware and Swift Rivers into the Wachusett Reservoir by means of a tunnel and for the construction of a reservoir on the Swift River.

Under the provisions of both Acts the Commission so established is empowered to "take by eminent domain or acquire by purchase or otherwise the flood waters, as hereinbefore defined, . . . . and all water rights, water sources, lands, rights of way, easements and other interests in land, including any cemetery.

> Acts of 1926, Chapter 375, Section 5
> Acts of 1927, Chapter 321, Section 4

The 1926 Act further provides:

> "The owner of any real estate, *whether within or without the Commonwealth*, which is not taken but is injured by the taking of the waters of the Ware River under the authority of this Act or by the construction of the works incidental thereto shall be entitled to damages therefor and may recover the same from the Commonwealth as in the case of a taking in accordance with the provisions of this Act." (Reprint of Answer, p. 42.)

The 1927 Act provided for the filing of a claim by "any person or corporation claiming to be injured."

These statutes, then, recognized the common law principle of riparian ownership by providing for payment for any injury to lower riparians and for a taking where necessary by eminent domain. The statutes made no attempt to effect a change in the common law rules as obtained in the Commonwealth at the time the statutes were passed.

On the other hand, it recognized the validity of rights established under the common law rule and provided for payment for them. A sovereign state may, of course, in the exercise of its legislative authority take from its inhabitants their property with the provision that it must take that property in such a manner as not to deprive its inhabitants of their property rights without due process of law.

In other words, the Commonwealth may deprive the individual inhabitant of his property and property rights but it must make just and fair compensation to the inhabitant so deprived.

The Commonwealth by enacting this legislation took cognizance of the fact that the common law rights of riparians existed within the borders of Massachusetts and in accordance

with the existence of said rights provided for making compensation for their taking. The statutes, then, did not in any way change the status of the law on riparian rights but rather recognized and provided for the enforcement of those rights.

Inasmuch as the use which Massachusetts intends to make of the water is not a riparian use she must make compensation for such property rights of lower riparians as are damaged or lost. There are two methods of acquiring property in such a case; one is by the exercise of the sovereign right of eminent domain and the other is by ordinary purchase.

The State of Connecticut claims that it has shown by clear and convincing evidence that property rights of citizens within the State of Connecticut have been damaged by the contemplated diversion.

The right of Massachusetts to exercise its power of eminent domain does not extend beyond the territorial boundaries of that state and she can not condemn for the benefit of Massachusetts, property of inhabitants of other states when that property is without her borders.

The only way by which Massachusetts can lawfully acquire property and property rights belonging to inhabitants of Connecticut and located in Connecticut, is by the ordinary method of purchase.

There has been no attempt made by Massachusetts to effect a purchase of the rights that she is infringing within the State of Connecticut and the only method of redress offered to the State of Connecticut and its citizens for any damage that will ensue to them from the contemplated diversion is the provision in the Massachusetts statute authorizing the diversion, which allows any person aggrieved by the actions of Massachusetts to come to Massachusetts and present a claim to a Commission

set up by Massachusetts for the amount of damage suffered, and in the event that this claim is disallowed the person so damaged may appeal to the Massachusetts courts. Such a remedy is not an adequate legal remdy.

The rule is phrased in *Stanton v. Ambrey*, 46 Conn., 595, as follows:

> "But no legal remedy can be considered as adequate, which a party is compelled to go into a foreign jurisdiction to avail himself of. It must be a remedy which our own Courts can apply."

*No competent legislative authority has authorized the taking of these waters*

The Special Master erred in holding that water may be taken from the watershed of an interstate stream and forever removed therefrom so as to deprive the lower states of the use thereof, without the exercise of the legislative authority prescribed by the Constitution, which is the legislatures of the states with the approval of the Congress of the United States. (Exception 14.)

1. *Taking—A legislative function*

The exercise of the power of eminent domain is not a granted power under any constitution. It is an inherent power of sovereignty. The state or the United States, for any public purpose, has the inherent power to take the property of its citizens. The determination of what property shall be taken, and the amount of the property to be taken, is a purely legislative function of government. The only restriction upon this power is that the purpose for which the property is taken shall be a public purpose. So long as the purpose is a public purpose, the courts or the judicial power of the government

have no jurisdiction to review the action of the legislative department in authorizing the taking or the determination of whether or not the taking is necessary.

Rindge Co. *v.* County of Los Angeles, 262 U. S. 700.

2. *Compensation is a judicial function*

As contrasted with the taking, all of the constitutions provide that private property shall not be taken for public purposes without compensation. This constitutional provision confers upon the judiciary the determination of whether or not the compensation provided by the legislative enactment is a just compensation. It also clothes the judiciary with the power of preventing the taking of private property for public use without any provisions for compensation.

Seaboard Air Line Railroad *v.* U. S., 261 U. S. 299.

3. *A legal taking and compensation must exist to be constitutional*

Unless there is a taking of property authorized by some legislative department of government competent to act, and a provision made for just compensation for the property taken, it is impossible to acquire property for public use. Both elements must exist to constitute a proper exercise of the power of eminent domain.

4. *Condemnation limited by state boundaries*

Any state undertaking to exercise the power of eminent domain by legislative act is limited in the extent of its authority to its boundaries. No state has the authority to exercise this power over property or property rights located in another state. The only legislative act which is depended upon as authority for the taking of any riparian rights within

the state of Connecticut are the two acts passed by the Great and General Court of the Commonwealth of Massachusetts, known as Chapter 375 of the Acts of 1926, relating to the Ware River, and Chapter 321 of the Acts of 1927, relating to the Swift River.

The rights of the State of Connecticut and its citizens in the use of the waters of the Ware and Swift Rivers, as they flow into and through the Connecticut River, are property rights existing within the State of Connecticut. When the Commonwealth of Massachusetts undertakes to deprive these owners of their rights in these waters, it is not taking property rights which are located within the Commonwealth of Massachusetts, but property rights which are situated beyond its borders. These acts of the Commonwealth of Massachusetts speak only within the borders of that commonwealth; and insofar as they are depended on for authority to take property located within the State of Connecticut, they are void and furnish no adequate defense to this action.

*Waters cannot be taken without the consent of Connecticut*

There is no power under the laws in force both in Massachusetts and Connecticut to enable the defendant to remove the waters from an interstate stream without the consent of the complainant state. (Exception 21.) There must be some sovereign power to authorize the taking of this water. The Commonwealth of Massachusetts, having no authority through its Great and General Court to authorize the taking of property located in Connecticut, and no authority residing in the legislative department of the United States to authorize one state to take property situated in another state, there exists no legislative power which can authorize the taking of this property unless it be that the State of Connecticut might authorize the taking of the property of its citizens for a public use in the Commonwealth of Massachusetts.

*There is no adequate remedy at law*

The Special Master erred and mistook the law in holding that in a controversy between states where it is possible to measure the damages inflicted upon the rights existing in one state the remedy is one at law. (Exception 12.)

*Sovereign cannot be forced to accept compensation*

The claim is made that by the Acts of the Commonwealth of Massachusetts a provision is made for an award of compensation to be made by the courts of the Commonwealth, when the citizens of another state are willing to have this question considered in the courts of the Commonwealth of Massachusetts. Whatever effect this might have in the case of individual citizens, it certainly can have no effect as far as the State of Connecticut is concerned. One state has no right, by legislative enactment to force another sovereign state to accept damages for any injury to its sovereign rights. Such a doctrine would deny the fundamental principles of sovereignty.

> "It is not lightly to be required to give up quasi sovereign rights for pay; and apart from the difficulty of valuing such rights in money, if that be its choice it may insist that an infraction of them shall be stopped."
>
> Georgia v. Tennessee Copper Co., 206 U. S., 230, 237.

*Effect of provision for citizens of one state to come into another and seek damages in the Courts of another state*

The defendant sets forth on page 27 of the Reprint of Answer that, under the two acts in question, of the Great and General Court of the Commonwealth of Massachusetts, there is a provision:

> "The owner of any real estate, whether within or without the Commonwealth which is not taken but is injured by the taking of the waters of Ware River under authority of this act, or by the construction of the works incidental thereto, shall be entitled to damages therefor and may recover the same from the Commonwealth as in the case of a taking in accordance with the provisions of this act." (Page 42 Reprint of Answer.)

The case of *Manville Co. v. The City of Worcester*, 138, Mass., page 89, is quoted on page 27 of the defendant's Reprint of Answer as apparent authority for the proposition that so long as this provision is contained in the act of the Commonwealth of Massachusetts, it is sufficient to justify the taking of water rights located outside of that Commonwealth.

The property right in Connecticut is injured by an act committed in Massachusetts. The damage occurs in Connecticut; the act that occasioned the damage was done in Massachusetts. Massachusetts sets up the claim that the injured citizen, resident of a sister state, is given an opportunity to resort to the Massachusetts courts to cover damages. His remedy is limited to that set forth in the statute. He must bring his action in the state courts. The Commonwealth of Massachusetts can not force a non-resident owner to come into its courts to redress his damage in contravention to its constitutional provisions and the jurisdiction of the federal courts.

8 Harvard Law Review, 138.

*Money damages is not governing factor*

The Special Master erred and mistook the law in overruling the Complainant's claim that any invasion of the right or privileges of a sovereign state calls for an injunction and does not require specific proof of the actual amount of money damages which might be suffered by reason of such invasion. (Exception 9.)

In a case where there is an invasion of right, as distinguished from damages caused by the exercise of a legal right, the courts have uniformly held in Connecticut and Massachusetts that the question of damage was included in the violation of the right; and that therefore it is unnecessary to allege specific damage in order to seek relief against the invasion of right in a court of equity.

> Water Commissioners *v.* Perry, 69 Conn., 461.
> Wellington *v.* Rawson, 231 Mass., 189.

The Special Master in the instant cause disposes of the Complainant's contention that any invasion of the rights or privileges of a sovereign state calls for an injunction regardless of damage as follows (Report of Special Master, p. 7):

> "It ignores that injunction is not granted where there is an adequate remedy at law; and also it seems to me directly in the teeth of the cases of *Missouri v. Illinois*, 200 U. S., 496, at 521; *New York v. New Jersey*, 256 U. S., 296, at 309, and *North Dakota v. Minnesota*, 263 U. S., 365, at 374. In the latter case the court said:
>
> "In such action by one state against another, the burden on the complainant state of sustaining the allegations of its complaint is much greater than that imposed upon a complainant in an ordinary suit between private parties. 'Before this court can be moved to exercise its extraordinary power under the constitution to control the conduct of one state at the suit of another, the threatened invasion of rights must be of serious magnitude and it must be established by clear and convincing evidence.' *New York v. New Jersey*, 256 U. S., 296, 309; *Missouri v. Illinois*, 200 U. S., 496, 521."

In other words, the Special Master evidently feels that the common law rule as to the rights of lower riparians within a particular state becomes of no consequence when the lower riparian is a sovereign state and where the abstracting upper

riparian is also a sovereign state, and the Master relies upon the oft-quoted statement from Missouri *v.* Illinois (Supra).

An examination of the facts in each of the cases wherein this statement regarding the necessity of a "threatened invasion of rights of serious magnitude" appears discloses the following:

In *Missouri v. Illinois* the action was to restrain the discharge of sewage into the Des Plains River, a tributary of the Mississippi and thus render the Mississippi unfit to drink; in *New York v. New Jersey*, the action was to restrain the disposal of the sewage of New Jersey into New York Harbor; in *North Dakota v. Minnesota* there was a bill to enjoin Minnesota from constructing cut-off ditches in the Mustinka River, thereby increasing its speed and raising the level of its outlet, Lake Traverse, and causing the Bois de Sioux, an outlet of the lake, to overflow and greatly injure the value of farm land in North Dakota.

Thus it will be seen that in the cases cited by the Special Master the issues involved were those of polluting and adding to the flowage, but none of the cases are authority on the point of the taking or the diverting of the water. The cases require that a threatened invasion of right must be of serious magnitude and established by clear and convincing evidence when the invasion is in the nature of pollution or adding to the flowage, but when the invasion is in the nature of a diversion or a taking which is substantially a taking of property, then the mere taking is sufficient even of itself without the necessary proof of the actual amount of money damages.

Under the common rule of both the States of Massachusetts and Connecticut the right exists to have the waters of a stream flow through the land of riparian owners undiminished in volume—that this right is a property right which

becomes vested in each riparian owner in the same manner as other property rights and which can only be taken from a citizen by due process of law by a sovereign to whom he owes allegiance for the purpose of some public use and for which he must be compensated.

The right of each state to adopt a common law doctrine is admitted and it has been decided that no state can legislate for, nor impose its own policy upon another state, and that Congress can not enforce any particular rule or doctrine upon any such state. Therefore, one state by means of its legislative power cannot take nor authorize the taking of property located in another state. The effectiveness of a state law ceases at its borderline, the principle being the rights of a property owner on being invaded and such invasion in itself is sufficient injury to warrant the court in prohibiting the taking. The State of Massachusetts has no power to take property situated beyond its boundaries and the State of Connecticut has never authorized the taking. In such a case the United States has no power to authorize the diversion.

It is significant that the Supreme Court in every instance speaks of "the threatened invasion of rights" and states that it must be "of serious magnitude." If the Court had meant that the threatened *damage* must be of serious magnitude it would have said so. It is the claim of the Complainant that the words "invasion of rights" mean exactly what they say, that if the Complainant can show that a right has been actually and seriously invaded by the State of Massachusetts, the Complainant is entitled to injunctive relief.

*The injury by a taking of real property rights without consent of Connecticut justifies an injunction*

Unquestionably either in Connecticut or Massachusetts, in a suit between private parties the complainant who has

presented a case in which the Court finds actual injury to property rights would be entitled to an injunction to prevent present and future injury to such rights. His rights would be protected by the Constitution of his own State and also by the Constitution of the United States. Can a sovereign state be accorded less consideration?

## VI. NAVIGATION

Navigation on the Connecticut River may be divided, for the purpose of discussion, into two sections: The first section being between Hartford, Conn. and Holyoke, Mass. and the second between Hartford, Conn. and Long Island Sound.

*Navigation actually exists between Hartford, Conn. and Holyoke, Mass.*

There have been numerous reports by Army Engineers recommending the establishment of a navigation project on the Connecticut River between Hartford, Conn. and Holyoke, Mass.

*Congress has adopted a definite project and appropriated money therefor.*

At the time of taking testimony no project had been adopted by Congress for the section of the River between Hartford, Conn. and Holyoke, Mass., but under an Act of Congress approved July 3, 1930 (Public—No. 520—71st Congress) (H. R. 11781) which was entitled, "An Act Authorizing the construction, repair and preservation of certain public works on rivers and harbors, and for other purposes," there is included the adoption of the project reported by the Chief of Engineers under date of April 24, 1930 and printed in Rivers and Harbors Committee Document Numbered 36, Seventy-first Congress, second session. The act appropriates one million dollars to be expended upon the project.

The following is quoted from the act:

> "Connecticut River, above Hartford, Connecticut: There is authorized to be expended upon the project reported by the Chief of Engineers under date of April 24, 1930, and printed in Rivers and Harbors Committee Document Numbered 36, Seventy-first Congress, second session, subject to the conditions set forth in said report, the sum of $1,000,000, and subject to the further conditions that the Bulkley, or Memorial, Bridge across the Connecticut River at Hartford shall not be disturbed, and that the lock and dam described in the report as to be built near the city of Hartford shall not be constructed so near said city as to in any way disturb city improvements or otherwise interfere with the said city."

There is actual navigation between Springfield and Hartford particularly. It is not only navigated by pleasure boats, but there is some navigation for commercial purposes. (Herman Burgi, J. S. E., 48.)

There are locks now in existence and records are kept of the number of boats passing through these locks, said locks being in connection with the power canal between Windsor Locks and Thompsonville just below the Connecticut-Massachusetts state line. However, in a Federal Power Commission permit issued to the Northern Connecticut Power Company, provision has been made by the Chief of Engineers, U. S. Army, requiring the construction of adequate locks to accommodate navigation. (Jacobs, J. S. E. 55, Record, 329.)

*Navigation will be affected by any diversions when the Hartford gauge is 4.5 feet or less.*

Navigation between Hartford and Holyoke will be impeded by diversions from the waters of the Connecticut

River "during the period when the gauge is 4½ feet at Hartford." This is due to the pools and rapids in the river and the natural fall of the river between Windsor Locks and Hartford. (Joint Summary of Evidence, Page 49.)

*Diversions will always occur at such gauge heights.*

Under the Massachusetts legislation as restricted by the communications from the Secretary of War, it will be permissible to withdraw water at all times when the gauge at Hartford is over 2.1 feet and even when the gauge is 2 feet or below, it will be possible to withdraw water under the above legislation and restrictions on 29 days during the average year, thus adversely affecting navigation between Hartford and Holyoke at practically all times when it is remembered that the gauge at Hartford stands at 4 feet or less about 200 days in the average year (Ex. "C-25"). It will be seen that navigation in this section of the stream is affected very materially.

*Navigation between Hartford and Long Island Sound is extensive.*

In regard to the section of the river between Hartford and Long Island Sound the Master found (Report of Special Master, 12), that "a substantial commerce is carried on between Hartford and New York (and neighboring ports), both passenger business and freight business largely coal and oil. Regular lines of boats ply in this commerce between Hartford and New York and its neighborhood. The Connecticut River has long been treated by the United States as navigable from Hartford to the sea. An annual expenditure for years has been made by the United States in preserving and bettering this navigation."

*Congress has adopted a definite project which has existed for many years.*

A project from Hartford to Long Island Sound was adopted by Congress in 1880, providing for a ten-foot channel. On Feb. 27, 1911, Congress adopted the present project for improving navigation between Hartford and the Sound. The Act provides for a channel 100 feet wide by 12 feet deep at mean low water. (J. S. E., page 38.) Mean low water corresponds to 2 feet on the Hartford gauge.

*The project depth has never been maintained.*

Although it was the intention of Congress to provide a 12-foot depth of channel at mean low water (2 feet on the Hartford gauge), this depth has never been maintained. Actually 10 feet and not 12 feet has been the controlling depth between Hartford and Long Island Sound. This is 2 feet less than the project depth as authorized by Congress. (J. S. E., page 39.)

*Between 3 and 4 feet on the Hartford gauge required to maintain fair navigation.*

The navigable capacity of the stream is greater than that capacity which is provided for under the Congressional authorization. It was testified that even if the project depth were available at all times, barges could not be loaded to their full carrying capacity, but this was only possible at times when there was more water in the river than was provided for in the project depth. For this reason, the evidence showed, those men experienced in navigating boats on the river would prefer even greater depths than the project provides.

Jeremiah E. Beckwith testified: "That when the gauge at Hartford shows between 3 and 4 feet, the presence or absence of half an inch of water would make a difference in

navigating the river because the barges are only loaded to a 9-foot draft but could be loaded to another foot or two deeper and so bring up much more." (J. S. E., pp. 40-41.)

Thomas Reed testified: "With the Hartford gauge between 3 and 4 feet, if any water is taken out, it will have an effect on the draft; that anything loaded a little deeper will have to be lightened up a little; that the cargoes are all loaded by the stage of water occurring in the river; that the more water there is in the river the deeper the barges will be loaded." (Joint Summary of Evidence, page 43.)

William H. Hill testified: "That, from his observation when vessels have heavy loads, there is no more water than is needed when the gauge is between 3 and 4 feet at Hartford." (J. S. E., page 47.)

Robert J. Noble testified: "That the best and most economical period of navigation on the River is when there is from 6 to 7 feet of water on the gauge." (J. S. E., page 51.)

It will be seen from the testimony of all these experienced pilots and river masters that navigation is best carried on at depths 2 to 3 feet in excess of the government project, showing that the capacity of the river for navigation is greatly in excess, not only of that which is provided, but of that which is authorized by Congress.

*Diversions will always occur at these gauge heights.*

Diversions will always occur at gauge heights from 2 to 4 feet, since under the restrictions of the Secretary of War, water is only released when the Hartford gauge is 2.1 feet or lower. The Special Master found (page 17), that "the Swift River Reservoir, operated as required by the Secretary, would have increased the flow of the Connecticut 43.5 days during

each year on the average," but he should also have found that the same data (Ex. "D-36") which showed the increased flows, also showed that on 29 days during the same period when the Hartford gauge was 2 feet or less, water would have been diverted from the Swift River, thus reducing the flows in the Connecticut River and lowering the gauge at Hartford as much as 2½ inches. (Ex "C-41.") Furthermore, that at all times throughout the year when the gauge is above 2.1 feet, that diversions will be taking place, reducing the flow in the Connecticut River and effecting reduction in stages of as much as 6½ inches.

The Complainant (Exception 24) objects to the finding of the Special Master on page 18 of his report where he finds:

> "There is no proof of difficulty in navigation at times when the stage of water is 12 feet or even 11 feet, 11 corresponding to an indication on the Hartford gauge of 3 feet. The discharge required from the Swift River reservoir during low water periods will somewhat benefit navigation. I cannot see how the diversion can injure navigation and therefore find that the proposed diversions will not interfere perceptibly or materially with the navigation of the Connecticut."

The last sentence is evidently a conclusion predicated upon the existence of the two preceding statements of fact. *First* that navigation is not difficult when the Hartford gauge is between 3 and 4 feet and, *second*, that a benefit is derived from discharges from the Swift River Reservoir when the flow is low.

We have already shown by the testimony of Beckwith (J. S. E., p. 40), Reed (J. S. E., 43), Hill (J. S. E., 47), and Noble (J. S. E., 51), all navigators upon the river, that the river cannot stand any diversion of water when the gauge heights are between 3 and 4 feet without adversely affecting

navigation. And we have shown that there will always be diversions of water when the gauge is between 3 and 4 feet.

The suggestions of the War Department requiring a discharge from the Swift River Reservoir are limited to occasions when the gauge height at Hartford is 2.1 feet and less. Therefore there will be no benefit from such discharges when the Hartford gauge is between 3 feet and 4 feet.

For these reasons we cannot help but feel that the Master overlooked the relationship between the War Department's suggestions and the gauge heights at Hartford and reached an erroneous conclusion that the proposed diversions will not interfere perceptibly and materially with the navigation of the Connecticut.

*Present navigation on the Connecticut River is difficult and expensive at low flows.*

Unfortunately the project depth as authorized by Congress has never been completely carried out. The actual channel has never been 100 feet wide, nor has the channel ever been dredged and maintained at a depth of 12 feet. (J. S. E., 38-39.) It is found by those who navigate the river that a depth of 9 or 10 feet actually exists when the Hartford gauge registers 2 feet so that there is about 2 or 3 feet of navigable depth missing at such times. Under these prevailing conditions, navigation between Hartford and Long Island Sound, especially in times of low flow, is very precarious. During this period small amounts of water, even to a half inch in depth, are very material as an aid to navigation.

Testimony of Jeremiah E. Beckwith, J. S. E., 40; Charles R. Bacon, J. S. E., 45; Wm. H. Hill, J. S. E., 47; Robert J. Noble, J. S. E., 51; Thomas Reed, J. S. E., 43.

The damage to navigation because of actual conditions now existing is reflected in the rates which have to be charged for the transportation of various commodities on the river. Consequent delays, injuries to the hulls of vessels, and the light cargoes which have to be carried increase the cost of transportation which must be borne by the consumer (J. S. E., p. 53).

*Two feet on the Hartford gauge is the point from which the project depth is reckoned.*

While it is true that the War Department has provided for an increase in the flow of the stream during low water conditions, these restrictions only apply at times when the water is at 2.1 feet or less on the Hartford gauge, but the restrictions are not so worded either to increase the flow at all times when the gauge is at that point, or to prevent diversions at such times. Furthermore the restrictions do not protect the navigable capacity of the stream, because due to inadequate dredging it is not until the Hartford gauge reaches 3 to 4 feet that the project depth is available. There is no protection to the navigable capacity of the stream at these times.

*Diversions will occur at 2 feet on Hartford gauge even under War Department suggestions.*

Since diversions will occur 29 out of 72 days when the gauge is at 2 feet, it is clearly evident that the restrictions of the Secretary of War not only do not protect the navigable capacity of the stream, but do not protect the navigability of the channel as it is now developed or intended to be developed under the Congressional project.

*No plans or specifications have ever been submitted for the dams and structures to be erected.*

The Special Master failed to find "That the Commonwealth of Massachusetts, by any of its agencies of government, has

not submitted any plans or specifications as to any proposed dams, structures, or works to be built or constructed in either the Ware or Swift Rivers to either the Chief of Engineers or the Secretary of War, nor have any plans or specifications been recommended by the Chief of Engineers or the Secretary of War." (Exception 25.)

The record shows that under date of November 30, 1927, the Metropolitan District Water Supply Commission wrote a letter making formal application for a permit for the diversion of the waters of the Ware River and on the same day a similar letter, making formal application for a permit for the diversion of the waters of the Swift River. (Reprint of Answer, Appendix B, page 81, Appendix C, page 89.) No plans or specifications were submitted with either of these letters, nor have any been submitted since the letters were written. (J. S. E., 37.) In reply to the Ware River application, the Secretary of War approved a recommendation of the Chief of Engineers, as follows:

> "In view of the controversy before the Supreme Court, it seems inadvisable to issue a formal permit for the present but to inform the applicant that no objection will be interposed by the War Department to the diversion of the flood waters exceeding 85 million gallons per day for the period October 15 to June 15, of each year." (Reprint of Answer, p. 87.)

Further, in regard to the Swift River diversion, the Secretary approved the recommendation of the Chief of Engineers that the applicant be informed:

> (e) "From the studies of past records it appears there will be no substantial alteration or modification of the condition or navigable capacity of the channel of the navigable portion of the Connecticut River if the flow of water from the Swift River as provided in the terms of Chapter 321, of the Acts of 1927 (Massa-

chusetts) be augmented during the critical period from June 1 to November 30, both inclusive, so that the measured rate of discharge on the Swift River shall be 70 cubic feet per second on such days as the United States Geological Survey gauge at Sunderland, Massachusetts indicates the discharge of the Connecticut River at that point to be less than 4,900 cubic feet per second and more than 4,650 cubic feet per second and shall be further augmented so that the measured rate of discharge past the impounding dam on the Swift River shall be 110 cubic feet per second on such days as the Geological Survey gauge at Sunderland, Massachusetts indicates the discharge on the Connecticut River at that point to be 4,650 cubic feet per second or less." (Reprint of Answer, 99, 100.)

It will be noted that neither of these represent positive action granting these permits but virtually are only statements as to how far diversions might take place before the Secretary of War would intervene.

The rights of the federal government and of the states in regard to such matters as interstate waters and navigation go directly to the rights of sovereignty as between the federal government and the quasi sovereign states.

In discussing rights to flowing waters, we will commence with the powers of the state as they existed originally; *second*, the delegation of power to the United States, its scope and limitations; and *third*, the powers which still remain in the State after such delegation.

*Distinction between ownership of land and use of water*

In discussing rights to flowing waters, one distinction must always be kept in mind. Water as such must be considered apart from the channel, bed and banks over, along or through which the water flows.

In the discussion of questions arising as to the use of water for the many purposes to which it is subject, this fundamental distinction is very often lost sight of.

As to water itself, whether of a navigable or a non-navigable stream, there cannot be absolute ownership of the water. The only interest which any one sovereign or subject has in the water is the right to its beneficial use as it naturally flows.

Blackstone Com., Book 2, Page 18.
3 Kent's Com., Page 439.
Sweet *v.* State of New York, 129 N. Y., 316.

This right to the beneficial use of water is divided between a public use, *jus publicum*, and the right of the individual, or *jus privatum*. Each is dependent upon some sort of ownership in the bed and banks of the stream through which the water flows.

*State's right to adopt policy covering its waters*

One problem of a government having streams within its domain is to determine upon some policy as to the relative rights of the individuals who own property along the banks of the streams, because it is the ownership of the land through which the stream flows which determines the rights in water.

Massachusetts and Connecticut, two of our earliest states, substantially adopted the common law doctrine of the English government as to water rights.

On the other hand the western states, with a vast amount of arid land, decided that for the best interests of their states as a whole, a different doctrine should be established and an allocation of the waters made based upon priority of appropriation for use in the reclamation of arid lands.

It must be conceded that any state has the right to determine for itself which of these doctrines, in whole or in a modified form, is to be adopted as the law of that particular state. When taken—this action cannot be modified or changed by the United States or any power other than the State which determines the rule.

In substance Massachusetts contends that the State of Connecticut and its citizens are not entitled to the use of the flood waters of the Connecticut River as they are supplied through the tributaries, but only to some unknown portion of the waters which flow through the stream during the course of the year, called by the Commonwealth of Massachusetts "the normal flow of the stream"; and it is further claimed that the State of Connecticut and its citizens would be better off without these flood waters, and that because they would be better off, and because they are not entitled to them, the Commonwealth of Massachusetts has the right to take them.

Under the law of the two states, all persons having a right to the use of flowing waters are entitled to all of the water which naturally flows through the stream, whether it be at the time of flood or at the time of drought, or at some intermediate season of the year.

> Thompson *v.* New Haven Water Co., 86 Conn., 597.
> Nemasket Mills *v.* Taunton, 166 Mass., 540, 544.

The states and the citizens thereof, being entitled to all of the waters of the stream as they flow, it is for the states, through their legislative departments, to determine as a state policy if any portion of the waters of a stream, whether flood waters or not, is to be allowed to be taken for any other purpose than a riparian use.

*State's right as to non-navigable streams*

The common law doctrine provides that the riparian owners own to the thread or middle of the stream and as such owners of riparian land are entitled to the water as it is wont to flow, undiminished as to quantity and unimpaired as to quality. As to the waters of these streams or the riparian lands which carry with them the beneficial use of the water, the state has no more interest than it has in any other property in the state owned by individuals.

> "The state has no ownership in any part of unnavigable streams, nor any control over them, except such as it has in all parts of its domain for governmental purposes."
>
> (See 40 Cyc., 558;
> Home for Aged Women *v.* Commonwealth, 202 Mass., 422.)

This governmental purpose is the right to take property for a public use by the exercise of the power of eminent domain and it is only in this way that the sovereign can acquire for itself or for any one else the property rights in riparian lands and the use of water flowing through them.

*Original power of states as to navigable streams*

The original states of the Union secured their governmental powers from Great Britain in two successive ways. *First*, by grant of royal charters, and *second*, as a result of the Revolutionary War. The sovereignty secured by charter was not an absolute one so far as navigable waters were concerned. The powers of the Crown had been limited by the provisions of *magna charta* and subsequent rights conceded to the people. The powers of the government as such and the superior conceded rights of the individuals comprising that

government were differentiated. The life of the government was predicated upon the due respect and jealous safeguarding of the rights to which the people were entitled. Judge Koonce, O. C. E., in his lecture at the Engineer School at Fort Humphreys, Virginia, April 23, 1926, expressed the powers of the Crown as follows:

> "Thereafter, title to the land and water in the space between high water mark on each side of the river was vested in the King merely as a prerogative right incident to the power of government, and was held by him in trust for the public easement, or rights of navigation and fishery, the power to regulate and control which was vested in Parliament as representing the people. Upon the settlement of the American Colonies these rights passed to the grantees in royal charters in trust for the communities established."

To this might also be added the obligation of the Crown to recognize and protect the right of riparian ownership in the individuals along the streams. The colonies succeeded to both the powers of the Crown and of Parliament. In their set-up of government, the Colonies also differentiated these powers but in a substantially different manner. To the legislatures were given the powers of the Crown, but the powers reserved to the people were not entrusted to any representative body, but reserved for their own determination and control. Hence the so-called Bill of Rights which is a part of the several state constitutions and which appears as a part of the Constitution of the United States. It is a most significant fact that it was by the assurance of the passage of the first ten amendments to the Federal Constitution which set forth these rights, that it was possible to secure the adoption of the Constitution as originally prepared. It was not enough for the colonies or states to be assured that these rights were inherent; they demanded and secured a positive declaration to that effect.

The successful conclusion of the Revolutionary War transferred to the several colonies all of the powers and prerogatives of the English Government.

1 Farnham on Water and Water Rights, page 47, sec. 9.
27 R. C. L., 1371 and cases cited.
Pollard *v.* Hagan, 3 How, 212.
St. Anthony Falls Co. *v.* St. Paul, 168 U. S., 349, 360.
Shively *v.* Bowlby, 152 U. S., 1.
Johnson *v.* M'Intosh, 8 Wheat., 543, 595.
Martin *v.* Waddell, 16 Pet., 367, 408-410, 414.

The colonies' governmental interest in the waters of navigable streams assumed that of a trusteeship for the benefit of the people as a whole.

1 Farnham on Waters, page 533.
Mobile Tr. Co. *v.* City of Mobile, 187 U. S., 479.
27 R. C. L., 1371 and case.
Pollard *v.* Hagan, 3 How, 212.
Scott *v.* Lattig, 227 U. S., 229.
Donnell *v.* U. S., 228 U. S., 243.

As we have before indicated, the State as a sovereign has no ownership in the water itself. There is, however, the right in the general public of the State, common to all of its people, to use the water of all streams where it is possible, for the purpose of navigation. If any stream is in fact susceptible of being used for the transportation of persons or the transportation of merchandise the water of such stream becomes charged with use of the general public of that State for such purposes.

*Ownership of bed and banks of stream*

To insure this use for the benefit of all its people, the State, to this extent, holds the title to the land underneath such navigable water to high water mark on both sides of the

stream. In addition to insuring the use of the water of these streams, designed by nature to furnish a means of water transportation, the title in the State also permits of the development of navigation by work upon the land lying underneath these waters. So that there is in the hands of the State the governmental function of maintaining the navigable streams which in fact are found to be navigable and their development for the purpose of navigation to their fullest extent, or to their navigable capacity.

This title which is in the State to land lying underneath navigable waters gives the State no proprietary interest in such lands. It is only a prerogative right to protect, preserve and develop navigation.

St. Anthony Falls Co. *v.* St. Paul, 168 U. S., 349, 358, 365.
Shively *v.* Bowlby, 152 U. S., 1.

This right of navigation simply means that a method of transportation by water is a common right to all the citizens of the State. The title in the State is likened to the interest of the State in its land highways which is that of an easement.

Packer *v.* Bird, 137 U. S., 661, 667.
Grand Rapids Co. *v.* Butler, 159 U. S., 87.

*Trusteeship for the public*

The title which the State has in the land underneath the water of navigable streams is that of a trustee. It holds the land and incident to such title the use of the waters of such stream in trust for the benefit of the general public to use such waters primarily for navigation. In other words, before any other interest in the use of such waters is to be exercised such use must be secondary to the public right of navigation and such use must be exercised in such a manner as not to destroy

or seriously impair the public right of navigation. This title being in the state as a trustee for all of its people, it cannot be alienated without their consent.

Bradshaw *v.* Mill Co., 52 Minn., 59.
Vol. 3, Kent Com., 427.
Miller *v.* Mendenhall, 43 Minnesota, 95, 101, 104.

*Individual rights*

The same principle is true in the case of the individual as in the case of the state. There is likewise no individual ownership of running water. It is merely such rights as the individual may have to its beneficial use. These rights follow and are appurtenant to the ownership of the land over which the stream flows or the land adjoining the stream. These rights are known as riparian rights and the owners as riparian owners have the proprietary interests, and the extent of these property rights are determined by the common law of the state in which the stream is located.

St. Anthony Falls Co. *v.* St. Paul, 168 U. S., 358-365.
Packer *v.* Bird, 137 U. S., 661, 667, 669-671.
Kaukauna Co. *v.* Green Bay Co., 142 U. S., 254, 272.
Hardin *v.* Jordan, 140 U. S., 371, 382.
Kansas *v.* Colorado, 206 U. S., 46, 96, 97.
U. S. *v.* Rio Grande Irrigation Co., 174 U. S., 690, 704, 705.
Broder *v.* Water Co., 101 U. S., 274, 276.
Boquillas Land & Cattle Co. *v.* Curtis, 213 U. S., 339.

The States of Connecticut and Massachusetts are common law states and the common law rule as laid down by Chancellor Kent is as follows:

> "Every proprietor of lands on the banks of a river has naturally an equal right to the use of the water which flows in the stream adjacent to his lands as it was wont to run (*currere solebat*) without diminution or alteration. No proprietor has a right to use the water to the prejudice of other proprietors above or below him unless he has a prior right to divert it or a title to some exclusive enjoyment. He has no property in the water itself, but a simple *usufruct* as it passes along. *Aqua currit et debit currere et currere solebat* is the language of the law. Though he may use the water as it runs over his land as an incident to the land, he cannot unreasonably detain it or give it another direction, and he must return it to its ordinary channel when it leaves his estate."

The uses which the riparian owners might make of the water as it passes by their land included the right to use a reasonable portion of it for domestic purposes, the right to bathe in the stream and the right to use the water for manufacturing purposes. This last right, however, was predicated upon compensating the riparian owners along the stream in the event that it was either held back from or flooded the land of other riparian owners.

All of these uses, which attach to the riparian lands, contemplated the substantial return of the water used to the stream for the further use by other riparian owners below. There was no right attached to any riparian owner to so divert the waters of the stream that the water would be permanently withdrawn from the stream and the lower owners forever deprived of the use of such water.

Riparian rights, attaching to non-navigable streams, are of primary importance because by the common law of both Connecticut and Massachusetts, the riparian owners owned to

the thread of the stream. In the case of navigable streams, as we have already shown, the primary use of the water was for the common purposes of navigation. In such streams the use by the riparian owners, while it existed, was always subject to the common right of the general public to navigate the stream and the right of the state to improve the navigation of the stream. Yet subject to such rights, the riparian owners still possessed the same rights which they did upon non-navigable streams.

The rights in the riparian owners are vested rights of property, which under the constitution of the states cannot be taken from them except for a public purpose of the state in which they are located, and in all cases by due process of law which must provide compensation be made for the property rights taken.

To sum up, the states, before the United States was formed, possessed certain title to the bed and banks between high water mark of all its navigable streams. As an incident to this title, the state was entitled to the use of the water flowing therein for navigation purposes. The state for the benefit of all of its people held this land in trust for its people, a trust which was not alienable. The trust consisted in the maintenance of navigation by all of its citizens of its navigable streams and the right to improve such navigation should it so desire.

*Intrastate, interstate and foreign commerce*

The state also had the right to regulate and control all commerce over these navigable streams between the state and other states and between the state and foreign land. The state also had the obligation and duty not only to use the water in these streams for navigation purposes but to make certain that

any surplus water not needed for navigation should be at the disposal of the riparian owners for such beneficial use as they were entitled to.

*Delegated powers of the United States*

The framers of the Constitution of the United States recognized the restricted powers of the sovereign states, i.e., restricted as to each other, although unlimited within their own boundaries, and each state relinquished certain of its powers over the use of its navigable waters, by granting to the United States the power to regulate interstate commerce.

*As to interstate and foreign commerce*

As an incident to this power was the power to regulate, preserve and protect the navigability of the waters located within the several states for the use of the general public for interstate and foreign travel and commerce.

Under this delegated power, the United States acquired no title to the water, the bed nor the banks of navigable streams. Consequently, no power is lodged in any agency of the federal government to authorize directly or indirectly the taking away or diversion of any portion of the waters of navigable streams nor the disposition of any of the land under them. The waters may be used for some navigable purpose by or under the authority of the federal government but for no other purpose.

The powers vested in the United States have been repeatedly described as the duty to preserve and protect the navigability or navigable capacity of these instrumentalities of interstate and foreign commerce.

> United States *v.* Rio Grande Irr. Co., 174 U. S., 690.
> St. Anthony Falls Co. *v.* St. Paul, 168 U. S., 349.
> The Montello, 20 Wall, 430.

This power has also been expressed as the power of "regulating and improving navigation."

Gibson *v.* U. S., 166 U. S., 269.
U. S. *v.* Chandler-Dunbar Co., 229 U. S., 53.
U. S. *v.* Cress, 243 U. S., 316.
McCready *v.* Virginia, 94 U. S., 391.
Illinois Central Railroad Co. *v.* Illinois, 146 U. S., 387.

Also as the protection and encouragement of interstate commerce.

1 Farnham on Water & Water Rights, page 54, sec. 12.
Jolly *v.* Terre Haute Drawbridge Co., Fed Cases, No. 7441.
Texas and P. R. Co. *v.* New Orleans, 40 Fed., 111.

"The authority is given to Congress for the purpose of aiding, and not destroying, navigation and commerce; so that, although authority over the stream is absolute in execution of the trust imposed upon it, whatever obstructions it authorizes must be for the purpose of improving the navigation of the stream, or of facilitating commerce."

1 Farnham on Waters & Water Rights, page 60, sec. 14.

*Includes navigable stream and its tributaries*

The Ware and Swift Rivers are tributaries of the Connecticut River, a navigable stream, and some of their waters are concededly essential to present navigability of the Connecticut. This being so, makes their waters "navigable waters of the United States."

The fact that the War Department has already assumed jurisdiction over these waters and is prepared to limit the pro-

portionate part of these waters which it will allow to be diverted, is strong evidence that this Department considers them "navigable water of the United States." Otherwise, the United States would have no jurisdiction over them.

Navigable water of the United States has been held to mean:

> "A river, or other waterway, constitutes a navigable water of the United States, within the meaning of the aforesaid Acts of Congress, when it forms, by itself or by uniting with other waters, a continuous highway over which trade and travel is or may be conducted between the states themselves, or between the states and foreign countries."
>
> The Daniel Ball, 10 Wall, 557.

It has also been defined to mean:

> "Such waters are those which form, in their ordinary condition, by themselves or in connection with others, highways over which commerce is, or may be carried on with other states or foreign nations in the customary modes in which such commerce is conducted on water."
>
> 1 Farnham on Water & Water Rights, 67, sec. 15.
> U. S. *v.* Burlington & H. County Ferry Co., 21 Fed., 332.
> The Montello, 11 Wall, 411.
> Willamet Iron Bridge Co. *v.* Hatch, 19 Fed., 347.
> Miller *v.* N. Y., 109 U. S., 385.
> Neaderhouser *v.* State, 28 Ind., 257.
> Hickok *v.* Hine, 23 Ohio State, 523.

From these definitions it is evident that the stream in question, of itself, may not be navigable, but if it contributes to other water so that a channel of commerce is afforded for trade and travel between states or within the state, the water then becomes "navigable water of the United States."

All the tributaries of a navigable stream are within the class designated by our Courts as "Navigable Waters," under the care and regulation of the United States as such.

This principle has been recognized by the War Department in this case, where it has limited the diversion to be allowed from the stream.

The duty of the War Department is to protect and promote navigation—not to say how far it can be tampered with before injury results.

This principle has also been approved by the Supreme Court of the United States.

U. S. *v.* Rio Grande Irrigation Co., 174 U. S., 690.

*Navigable capacity*

A number of the cases involving the powers of the United States concerning navigable waters have mentioned the term "Navigable capacity." A distinction also appears in the Rivers and Harbors Act of 1899 between obstruction to navigable capacity, which can only be authorized by the affirmative Act of Congress and navigability, which is to a considerable extent within powers of the Secretary of War acting on recommendation of the Chief of Engineers.

There is no certain definition of the term, "Navigable capacity." Although the terms have been employed together to a considerable extent, it hardly seems probable that the term "navigable capacity" and "navigability" are synonymous.

One of the powers which the United States has always claimed and actually exercised for a great many years has been the power to improve the navigability of streams under its jurisdiction. So that a stream partially navigable in the

first instance may be improved by the Government and become wholly navigable; or where a stream is navigable only a portion of the year, by the improvements made by the United States or by the states it may become navigable during the whole year. The improvements authorized by Congress originally were confined largely to dredging and deepening the channels. Recently, studies have been made by the United States for the improvement of navigation by a control of the flow of the stream. The Government is now expending large sums of money in surveys, having as their objective the use or harnessing of the flood waters so as to improve the flow of the streams during dry periods and periods of injurious floods.

From this it seems that it is rather the potential or possible capacity for navigation which can be obtained by artificial improvements which should determine the navigable capacity of the stream rather than to say that the navigability as it exists should be the test.

As an example, if a stream be navigable for six months in the year, as nature has allocated the water, and not navigable during the other six months, but it should be found that by storing the surplus waters during the six months of plenty and permitting these stored waters to flow down the stream during the six months of drought, a continuous navigation of twelve months in the year could be obtained, it seems a reasonable claim that the navigable capacity of such a stream would be twelve months in the year instead of six months. In other words, navigable capacity is to be determined by the total amount of water available, so controlled as to provide the maximum of navigability.

The construction placed upon this provision by the Supreme Court of the United States in the recent case of *Wisconsin et al. v. Illinois and Sanitary District of Chicago* (278 U. S., 367) has been to place in the hands of the Secre-

tary of War, acting on the recommendation of the Chief of Engineers, the determination in the particular case of what constitutes an unreasonable obstruction. In that case it will be recalled that on two different occasions the Secretary of War decided that the diversion of 4,167 cubic feet per second and 8,500 cubic feet per second respectively from the waters of Lake Michigan was not an unreasonable obstruction to navigable capacity. The Court, however, found that insofar as the diversion authorized by the Secretary of War was not for a navigable purpose, that there was no authority in the Secretary of War to grant a permit for such diversion. The Court further stated (page 417):

> "The normal power of the Secretary of War under Section 10 of the Act of March 3, 1899, is to maintain the navigable capacity of Lake Michigan and not to restrict it or destroy it by diversions."

In other words, the diversion of water from any navigable stream for a purpose other than navigation is beyond the powers of the Secretary of War because of necessity it restricts navigable capacity.

The states having delegated to the United States the power to regulate and control interstate commerce, it necessarily follows that all the navigable water of the United States, which is susceptible to use for water transportation can be used by the United States to its fullest extent for navigable purposes. It may use the water within the same watershed, in the same stream or it may divert the waters or a portion of them from one stream into another; the only requirement is that some navigable purpose is to be served by this use of the water.

If the United States believes that the commerce will be best taken care of by the development of a new line of water

transportation, it may use any navigable waters of the United States to bring this about.

Where, however, there is water in a non-navigable stream which has not been a contributor to the navigability of a stream, the United States cannot obtain the use of this water except by the exercise of the power of eminent domain and the consequent payment of damage to the individual owners of the land bordering such non-navigable streams. This is a taking of private property for which the owner is entitled to compensation.

Cohen *v.* United States, 162 Fed., 364.

There is no ownership in the waters of any stream navigable or non-navigable in the United States. The most that the United States receives through the delegation of power to control interstate commerce is the use of the water to which the people of several states had in common to use such waters as a means of transportation and trade.

*Trusteeship*

To protect this common right before the adoption of the Constitution, the obligation to preserve and protect the common right of navigation and fishing in navigable water rested in the government of the states as trustees for the benefit of the general public.

By the adoption of the Constitution so far as these navigable waters were available or could be made available for any interstate or foreign trade or travel, the trusteeship to preserve and protect such water transportation was delegated to the United States and thereupon the United States became charged with the same trust which had been lodged in the states themselves. Such being the relationship between the United States government and the states, it is evident that neither the United

States nor any of its departments have the right to authorize, permit or allow any of the waters to be used or appropriated to any other use than that for which the trust is created.

It is claimed in Exception Twenty-sixth of the findings of the Special Master that the United States has no power or authority to permit the waters of an interstate stream to be diverted from its watershed into another and different watershed without the consent of both of the states through which the water flows; and, in Exception Twenty-seventh, that the Congress of the United States has no power or authority to permit the waters of an interstate stream to be diverted for any purpose other than the improvement of interstate and foreign commerce.

We have already discussed the relative powers of the United States and the several states as to the use of waters which are susceptible of being used for navigation purposes. The United States when it finds that the use of water is necessary, for the purposes of interstate and foreign commerce, has the right to use such waters for such purposes. There is also reserved to the states through which waters flow the right to use such waters for intrastate purposes; so that the use of flowing waters for navigation purposes where the stream flows through two states is divided between the three sovereigns; the United States, and that of each state through which it flows. After the use by the United States for purposes of interstate and foreign commerce has been satisfied, it is our claim that the water is still susceptible to the use by the two state sovereignties for purposes of intrastate commerce. This being so, the exclusive right to the disposition of any of these waters is not confined to any one of the three sovereignties entitled to such use. If the water is to be forever removed from any navigable purpose it is necessary that the consent of all three sovereignties should be had before such removal. It follows from this that the

United States cannot permit the transfer of any of the waters of an interstate stream from the watershed to which it is naturally attached, to some other watershed, without the consent of the two states through which the stream flows.

The only authority which Congress has to legislate concerning the use of navigable waters, is the constitutional provision delegating to the United States the power to regulate interstate and foreign commerce. This power limits the exercise by Congress to the use of water for navigable purposes. This power cannot be extended to authorize Congress to permit the use of any water of a navigable stream for a purpose not connected with navigation.

Wisconsin, et al. *v.* Illinois, et al., 278 U. S., 367.

In Exception Twenty-eighth it is claimed that, if Congress has the power to permit the diversion of waters of an interstate stream from one watershed to another, or if it has the power to authorize the use of navigable waters for purposes other than navigation, such powers cannot be delegated to and exercised by the Chief of Engineers and the Secretary of War; also that, if such delegation can be made, it has not been made under the provisions of Sections 9 and 10 of the Rivers and Harbors Act of 1899.

In the case of *Wisconsin, et al. v. Illinois, et al., supra*, the waters of Lake Michigan, by affirmative permit, were authorized to be diverted into the watershed of the Mississippi River, and the primary purpose for which the diversion was authorized is found a purpose not in aid of nor an improvement in navigation. The Court did not directly say whether or not the authority of the Secretary of War, in permitting the diversion from one watershed into another, was justified, because it was found that the diversion was not primarily for the purpose of aiding navigation in the watershed of the Mississippi River,

but was for the purpose of diluting the sewage of the Sanitary District of Chicago. At least the court held that the diversion for this latter purpose was unjustified and not within the powers of the War Department.

As to the diversion from one watershed into another, while recognizing that such question was raised in the case, the Court did not finally determine whether it could be done or not. It merely stated the proposition that thus far Congress had not authorized a diversion from one watershed into another; so that it may be said that the question of whether such diversion can take place or not is still undetermined. At least, there is nothing in the case which indicates that such a diversion can be delegated to the Secretary of War or that it has been delegated under the provisions of Sections 9 and 10 of the Rivers and Harbor Act of 1899.

*Section 9, Rivers and Harbors Act, 1899*

The Congress of the United States in drafting the Rivers and Harbors Act, approved March 3, 1899, has recognized the principles which we have thus far set forth in this brief in both Sections 9 and 10 of that Act.

Section 9, so far as applicable to this case, provides as follows:

> "That it shall not be lawful to construct or commence the construction of any . . . . dam . . . . . in any . . . . . *navigable river, or other navigable water* of the United States until the consent of Congress to the building of such structures shall have been obtained and until the plans for the same shall have been submitted to and approved by the Chief of Engineers and by the Secretary of War."

The first requirement of this section is that a dam is to be constructed. There is nothing in this section which pro-

vides that the proposed dam shall in any way affect present navigation or navigable capacity. The only requirement is that it shall be a dam, and in this case it is conceded that a diversion dam is to be constructed in the Ware River and two dams for the impounding of water in the Swift River. This brings these two structures squarely within the terms of this section.

In Exception Twenty-ninth it is claimed that the proposed diversion dam on the Ware River and the proposed storage dams on the Swift River are dams within the meaning and intent of Section 9 of the Rivers and Harbors Act.

The second requirement is that the dam is to be constructed in any "navigable river, or other navigable water of the United States." For the purposes of this argument, it is conceded that the Ware and Swift Rivers are not "navigable rivers." So that to come within the terms of this section the waters of the Ware and Swift must be "other navigable water of the United States."

In Exception Thirtieth it is claimed that the waters of the Ware and Swift Rivers are navigable waters of the United States within the meaning of Section 9 of the Rivers and Harbors Act.

In this connection it should not be forgotten that the Commonwealth of Massachusetts must of necessity have concluded that these waters were within the term of "Navigable water of the United States," when they requested of the War Department a permit for the use of these waters as a water supply in another and separate watershed. It also should not be overlooked that the War Department so far considered these "Navigable water of the United States" that it has suggested certain modifications in the proposed plan for diverting these

waters, which it insists must be complied with or the department will have to object to the taking of these waters for such purposes.

We have already discussed the meaning of the term "other navigable waters of the United States" where it is claimed that a navigable stream includes of necessity the waters of its tributaries. The action of the War Department as set forth in the amended answer filed by the Commonwealth of Massachusetts is based upon the fact that the dams to be erected in the Swift River will have an effect upon the present navigability of the Connecticut River unless the Commonwealth of Massachusetts provides for the release of more water than its legislation provides for; and it is conceded by the War Department that unless it does so there would be grounds for federal interference in the operation of these dams. The only theory upon which the War Department will have any jurisdiction in this matter is that the navigable waters of the United States are in some way being affected by the construction of these dams. The Complainant claims that it is not within the province of the War Department to determine how far the Commonwealth of Massachusetts may interfere with the navigability of a stream where the interference is to be accomplished by the construction of a dam; that under this section of the Rivers and Harbors Act it is only by an Act of Congress that a dam can be built in any waters which are navigable in themselves or which contribute to the navigability of a stream to which they are tributary.

It does not appear in the record that any Act of Congress has been passed authorizing the construction of a diversion dam in the Ware River or any dams in the Swift River; that the waters of these two rivers, forming a part of the navigability of the Connecticut River, and being the waters of the United States, such fact must affirmatively appear in the

answer, if it is intended on the part of the Commonwealth of Massachusetts to rely upon some federal authority for making a diversion of the waters of these two streams.

It is also claimed that the second portion of Section 9 of the Rivers and Harbors Act provides that plans for such structures must be submitted to and approved by the Chief of Engineers and the Secretary of War; and that nowhere does it appear that any plans have been submitted to or approved by either or both of these officers of the government. The Complainant claims that until such action has been taken the Commonwealth of Massachusetts cannot set up any federal authorization for this diversion as a defense.

In Exception Thirty-first it is claimed that, as to the dams proposed to be built in the Ware and Swift Rivers, the plans and specifications must be submitted to and recommended by the Chief of Engineers and, approved by the Secretary of War, and the consent of Congress must be obtained for such structures, under Section 9 of the Rivers and Harbors Act.

It is conceded in this case than no plans and specifications have ever been submitted to or recommended by the Chief of Engineers, or approved by the Secretary of War, although the section of the Rivers and Harbors Act under discussion specifically provides for this action.

Under this section the questions as to whether it does or does not, or to what extent it may affect navigation, are left in the hands of Congress. All that the Chief of Engineers and the Secretary of War can do is to receive plans and approve them. The authority to allow the construction of the dams rests with Congress, and it is Congress alone which can authorize such construction.

The defendant has set forth the action of the Secretary of War upon applications for permits which were filed by the defendant. Under this section of the law these amendments to the answer do not add to the defense, inasmuch as they show upon their face that Congress has never approved or authorized the construction of any diversion dam in the Ware River or any dams for impounding water in the Swift River.

Nowhere is there any evidence showing that under the provision of Section 9 of the Rivers and Harbors Act of 1899 has Congress authorized the construction of any dams in either the Ware or the Swift Rivers; or that any plans have been submitted to or approved by either the Chief of Engineers or the Secretary of War.

*Section 10, Rivers and Harbors Act, 1899*

Section 10 of the Rivers and Harbors Act of 1899 may be divided into three parts. The first sentence provides as follows:

> "That the creation of any obstruction not affirmatively authorized by Congress, to the navigable capacity of the waters of the United States is hereby prohibited;"

In Exception Thirty-second it is claimed that a diversion of water from one watershed into another affects adversely the navigable capacity of the stream from which it has been taken.

Recognizing the principle that the total water in the watershed which contributes to the volume of water flowing through a navigable stream is the condition which must be preserved by the United States for the purpose of interstate and foreign commerce, Congress has reserved to itself the determination of what action it will take, should the navigable capacity of the navigable stream be jeopardized. It has expressly withheld from its administrative officers, the Secretary of War and the

Chief of Engineers, any power to authorize the disposal of any of these waters, or by agreed non-interference or other means allow any of the waters which form a part of the navigable capacity of a stream to be removed therefrom. Such removal must not be permitted without an affirmative Act of Congress.

If there is any distinction between the "navigable waters of the United States" as used in Section 9 and the term "waters of the United States" this section at least applies to the waters of the Ware and Swift Rivers if they have any "navigable capacity."

It seems fair reasoning to assume that any tributary of a navigable stream has some navigable capacity. Very few streams would supply sufficient water to be classed as navigable streams without the aid of tributaries. Consequently each tributary has a capacity and by furnishing its water makes possible the navigability of the main stream.

Therefore, it is logical to say that any interference with the flow of the tributary of a navigable stream is an obstruction to the navigable capacity of that stream, as well as the navigable capacity of the main stream.

This portion of Section 10 of the Rivers and Harbors Act of 1899 originally provided that the creation of any obstruction not affirmatively authorized by law to the navigability and capacity of any of the waters of the United States was prohibited. Under this phraseology it was held that the authority of the state was sufficient to interfere with the navigable capacity of a navigable stream.

> U. S. *v.* Bellingham Bay Boom Co., 176 U. S., 211, Act of 1890.

It was this decision which was responsible for the change in the wording of the statute.

Inasmuch as the War Department has taken cognizance of these diversions, and has specifically found that the navigable capacity of the Connecticut River is affected by the proposed diversions, the Complainant claims that it is necessary, if federal authority is to be set up as a defense to this action, to show some affirmative Act of Congress in order to constitute a valid defense to this action.

In Exception Thirty-third it is claimed that the affirmative Act of Congress, required in the first clause of Section 10 of the Rivers and Harbors Act, is not satisfied when the Chief of Engineers or the Secretary of War, by refusing to take or by abstaining from taking action to prevent a diversion of water from one watershed to another for a non-navigable purpose, allows such abstraction to be accomplished.

In Exception Thirty-fourth it is claimed that some affirmative Act of Congress is necessary and required, other than the specific powers which are given to the Chief of Engineers and the Secretary of War in the remaining two clauses of Section 10 of the Rivers and Harbors Act.

It is conceded that the second portion of Section 10 has no application to this case. The third part, so far as it is applicable to this case, reads as follows:

> "And it shall not be lawful . . . . . in any manner to alter or modify . . . . . the capacity of . . . . . the channel of any navigable water of the United States, unless the work has been recommended by the Chief of Engineers and authorized by the Secretary of War prior to beginning the same."

It is the claim of the defendant that it is under this portion of Section 10 that it filed its applications for permits to make these diversions, and that the action of the War Department as to the Ware and Swift Rivers, as set forth in the amendment

to the answer (Reprint of Answer, Appendix B, C), is sufficient authority, so far as the federal government is concerned, for them to proceed with the diversions.

In Exception Thirty-fifth it is claimed that the action of the Chief of Engineers and the Secretary of War in the present instance is not legally sufficient to authorize a diversion, because no plans or specifications for the work proposed to be done were ever submitted to or recommended by the Chief of Engineers, nor have any such plans and specifications ever been approved by the Secretary of War, as specifically provided in the third clause of Section 10 of the Rivers and Harbors Act.

Its purpose is to require a permit for work which will have to do with the widening or deepening or obstructing the channel of the stream, but not the diversion of water from the river. There is a considerable difference between the channel through which water flows and the water flowing through the channel; but even if this part of Section 10 did have any application, the action by the Chief of Engineers and the Secretary of War do not come within the terms of this section.

The defendant acknowledged the superior power in the government of the United States to permit the diversion contemplated by the Commonwealth of Massachusetts, and filed applications with the Secretary of War to make these diversions, but no positive permits have been received from the War Department.

But in neither one of these cases does it appear that any work or any construction or any diversion of water has been either recommended by the Chief of Engineers or approved by the Secretary of War. There is no provision of law which authorizes these two officers to do anything more than recommend and approve. Any other action upon their part is purely

voluntary, outside the scope of their duty in the premises, and furnishes no authorization to the Commonwealth of Massachusetts to proceed with its diversion of these waters.

*Reserved powers of states*

Of the several powers and duties in respect to waters which were possessed by the states prior to the adoption of the Constitution of the United States, only one was directly delegated to the federal government. That was the power to regulate and control interstate and foreign commerce. It is only when some interest connected with interstate or foreign commerce is involved that the United States or any of its departments has the authority to provide what shall be done concerning the waters of navigable streams.

The states reserved to themselves a title as trustee to the bed and shores of navigable streams to high water mark; the right to the use of the waters of all navigable streams for navigable purposes not inconsistent with their use for interstate and foreign commerce; as trustee to maintain, preserve and protect the rights of the public to navigate in all of these waters; and the guarantee of the vested rights of the riparian owners along the banks of these streams.

The rights of the several states and of the people under constitutions are guaranteed by the Fifth and Fourteenth Amendments to the Constitution of the United States. These provisions limit the exercise of all grants of power delegated to the United States, including the power to regulate and control interstate and foreign commerce.

U. S. *v.* Adair, 152 Fed., 737.
Adair *v.* U. S., 208 U. S., 161.
Wilson *v.* New, 243 U. S., 332.

In Exceptions Thirty-sixth and Thirty-seventh it is claimed that the finding of the Secretary of War that the diversion will

not injure appreciably or materially navigation on the Connecticut River, and that the United States is willing to release the waters of the river from the burden of interstate and foreign commerce, is not conclusive as to the use of the waters of this river for navigation purposes, and does not preclude the State of Connecticut from objecting to the removal of such waters from interstate, foreign or intrastate commerce.

So that the United States cannot in any way violate the rights of the people of Connecticut to have the use of all of the water contributing to the navigability of any stream used for such purpose until the navigability of the stream has been developed to its capacity. No more can the United States violate the vested property rights of riparian owners along such navigable stream to use all of the waters flowing in the stream whenever the purposes of navigation have been satisfied so long as such use is not an interference with navigation.

Under our constitution these rights of the people as a whole and of the riparian owners can only be protected through the action of the state in the sovereign capacity when these rights are attacked by another state or commonwealth. As to the people as a whole they can only be represented and their common rights protected by action of the state as trustee for them.

Thus the state is in duty bound to prevent any violation or impending violation of these rights of its citizens who are the beneficiaries of a public trust.

It is contended that if the War Department, through its Secretary of War and Chief of Engineers, has not the power to grant the applications of the Commonwealth and issue permits affirmatively authorizing the diversions sought, it is not within their province to inform the applicant that the department will interpose no objection to the proposed diversions if

the amount of water specified by them is all that is to be diverted. This was the action taken on the Ware River application.

If the applicant was a riparian owner upon these rivers and intended to use the water for a legitimate riparian use, this position might be sustained. The United States would then say, in effect, to a riparan owner so far as interstate commerce is concerned, your use will not at present interfere with the navigation on the Connecticut River and we will not object to your exercising your riparian rights to use it. In such a case, however, the riparian owner in using the water does so subject to the right of the United States to stop his use at any time that interstate or foreign commerce requires the return of that water to such use. Besides, his exercise of user is not exclusive and all others on the stream can use the same water for their own needs as riparian owners. There is no complete withdrawal of the waters from the stream. They are returned, after his wants are satisfied, to the stream for the common use of all others below him on the stream.

This is not the situation in the present case. Here the use by the Commonwealth of Massachusetts withdraws the waters entirely from the stream and their subsequent use by other riparian owners. The United States in this instance is not releasing to someone who has a proprietary right to use these waters but to some one who has no proprietary title in their use. They are not released by the United States for a riparian use. They are not released for a purpose connected with navigation.

The United States has nothing to give in the way of title to these waters and release of the waters from the easement of use for purposes of interstate and foreign commerce immediately tends to divest the states through which the stream flows and the riparian owners of their respective rights in the use of those waters.

Such being the case there is no right in the United States to aid, assist, encourage or allow the use of these waters for a non-navigable purpose by someone who has no reversionary right to their use.

Except as the owner of riparian lands and except for the purpose of regulating interstate commerce, the United States has no property in or sovereignty over the streams or watercourses within the boundaries of the several states. The sovereignty and ultimate control is in the state or in the riparian owner, or in both, according to the constitutions and laws of the several states, and the power of the Federal Government over the streams is no greater in the so-called public land states than in the states east of the Mississippi River.

Kansas *v.* Colorado, 206 U. S., 46, 92.

When the War Department issues a permit it is careful to protect both the rights of the states and the rights of individuals. There appears in each permit the following language:

> "NOTE—It is to be understood that this instrument does not give any property rights either in real estate or material, or any exclusive privileges; and that it does not authorize any injury to private property or invasion of private rights, or any infringement of Federal, State or local laws or regulations, nor does it obviate the necessity of obtaining *State assent* to the work authorized. *It merely expresses the assent of the Federal Government so far as concerns the public rights of navigation.* (See *Cummings v. Chicago,* 188 U. S. 410.)"

These permits also contain the provision that they are revocable at the pleasure of the War Department when it is found that the interests of navigation require such revocations.

In the case of the Ware River no restrictions appear. The applicant was informed:

> "Referring to your application of November 30, 1927, for *federal authority* for the diversion of the flood waters of the Ware River for an additional supply for the Boston Metropolitan District, this office has been directed by the Chief of Engineers to inform you that *no objection will be interposed by the War Department* to the diversion of the flood waters of the Ware River exceeding 85,000,000 gallons per day for the period October 16 to June 15 each year." (Italics are ours.)

There is no provision that property rights must be respected, that the states through which the water flows must assent, nor that the objection can be recalled at any time. To say that this is not in effect a permit is rather begging the question. What greater latitude of action could have been extended to this applicant if the authorization had been positive rather than negative. It was merely effecting the same result in a different manner.

In Exception Thirty-eighth it is claimed that the jurisdiction of the United States does not extend beyond the use of water for interstate and foreign commerce.

Even assuming that the United States has the exclusive right to determine how far the waters of a navigable stream may be used for interstate and foreign commerce, and even assuming that the United States has the exclusive right to restrict and reduce the use of these waters for such purposes, it certainly can have no right to say that such waters may not be used for navigable purposes other than interstate and foreign commerce. There is always left the reserved right in the states through which the stream flows, to use its navigable waters for transportation purposes within its own domain, regardless of whether the United States cares to use them for interstate and foreign commerce or not.

## VII. POWER

*There is an existing water power site*

The Special Master found that there was one possible power development site on the Connecticut River in the State of Connecticut:

> "This is at King's Island in Connecticut near the state line where 4,000 horse power is now developed at a 24 foot head. The company which owns this power has been authorized by the Federal Power Commission to build a higher dam to develop approximately 50,000 horse power." (Report of Special Master, p. 20.)

*It is susceptible of development*

The present power site is capable of development into a large hydro-electric plant. The methods of construction and the general plan of procedure to develop this power have been worked out by the company and are described in the testimony (Joint Summary of Evidence, page 54). This plan provides for the building of a dam further down the river than the present dam but to the same height as the present dam, thus avoiding the use of long canals for the transportation of water. In this way it is proposed to develop a plant of 50,000 horse power capacity.

*These plans have been approved by the Federal Power Commission*

The present dam and power development on the Connecticut River are owned by the Northern Connecticut Power Company. This company prepared plans for the development at King's Island as described above and submitted them to the Federal Power Commission. The project was authorized by the Federal Power Commission January 18, 1928, and accepted by the Licensee on January 25, 1928, a permit being issued on

February 1, 1928. This permit was issued by the Federal Power Commission after its investigation and (Joint Summary of Evidence, page 55) after it had satisfied itself that the company had complied with the laws of the State of Connecticut and the Commonwealth of Massachusetts and was able to carry out the proposed plans.

*The Commission has found that the company is able to carry out the development*

Exception is taken to the finding by the Special Master, page 20:

> "This work so far as the testimony shows has not been resolved on by the company, and so far as shown the required capital has not been subscribed or arranged for." (Report of Special Master, pages 20 and 21.) (Exception 39.)

Mr. Jacobs testified, Joint Summary of Evidence, page 55, that the permit issued by the Federal Power Commission was issued after the Commission had satisfied itself of the *ability* of the Northern Connecticut Power Company to carry out the proposed plans. Complainant claims that there is no necessity imposed upon it for producing any other evidence of the financial ability of the Northern Connecticut Power Company. It is to be supposed that the investigation by a federal organization, such as the Federal Power Commission, as to the ability of a public service corporation to carry out a project for whose development it had requested a permit, is a sufficient proof, upon the issuance of permit. The finding of the Special Master that "so far as shown the required capital has not been subscribed or arranged for" (Special Master's Report, page 21), is contrary to the evidence. Complainant claims that the demonstration of financial ability as attested by the permit granted by the Federal Power Commission, comprehends the ability to arrange for subscriptions to capital.

*The power will be substantially reduced by proposed diversion*

The testimony is undisputed that enough water will be diverted from the Connecticut River to reduce the amount of power which can be generated at the power plant in Connecticut by 1,850,000 kilowatt hours per year (Joint Summary of Evidence, pages 54, 55, 56) according to Massachusetts legislation and by 1,320,000 kilowatt hours per year under the restrictions of the Secretary of War.

The percentage of decrease in productive results of the proposed development was conceded to be one per cent under the diversion project as outlined by the Massachusetts legislation and three-fourths of one per cent if the project is modified according to the suggestions of the War Department.

In the case of *Whitney v. Fitchburg Railroad Company*, 178 Mass. 559, the owner of the mill pond, claiming it to be capable of developing 200 h.p. per day, sought an injunction against the diversion of water from the pond, which diversion would reduce the power capacity of the pond 26/100ths h.p. or a little over one-tenth of one per cent of the total power capacity of the mill pond. The Supreme Court of Massachusetts granted the injunction on the grounds that such an interference with the power capacity was a substantial one, and stated that it was, therefore, unnecessary to pass upon the question as to whether or not an injunction would be granted regardless of substantial damage. The Special Master should have found, therefore, that this natural resource of the State of Connecticut is substantially damaged and depreciated and its development retarded by this loss of energy as claimed in Exception 41.

*Such damage is material*

It is set forth in Exception 44 that the Special Master should have held that such a damage is material; such a

quantity of power is sufficient to care for the lighting of many homes in the state practically in perpetuity. Money damages will amount to at least $7,920 per year. The Special Master found that "giving allowance for water released at times of low flow in accordance with the Secretary of War's requirements, the loss of power attributable to the diversion will amount to $7,920 per year, valuing each kilowatt hour loss at six mills." (Report of Special Master, page 21.) This amount when capitalized at 5% is equivalent to a capital loss of $160,000. The Special Master then proceeded, "from this should be deducted $80,000 representing a saving in capital investment resulting from the required addition to water in low flow furnishing 1,000 additional horse-power at low stages; this increase of minimum power would cause a corresponding decrease in steam-power plant, which will be required to supplement the water in times of low flow. This $80,000 deduction was testified to by Mr. Weston Fuller whose testimony was not questioned."

In Exception 40 the Complainant objects to the money damage loss as found by the Special Master.

The record shows that the figures for this $80,000 deduction were questioned and that the records failed to support the assumption of the witness who had made the calculations.

Mr. Weston E. Fuller, an expert witness for Massachusetts, testified,

> "That water power development operated in connection with a public utility during the dry weather season is operated to the best advantage to take care of the peak load during the day; in other words there are certain hours during the day, perhaps four hours when the load is very heavy. Now, if there is a pondage provided so that water can be drawn at a high rate for a short period, then this water power can be drawn upon so as to relieve the entire system during these four hours." (Joint Summary of Evidence, page 56.)

The records do not show that there is to be provided any "pondage," as referred to by Professor Fuller or that, were such pondage provided, the water could be drawn at a high rate for a short period of time when the load is very heavy; in fact the testimony in regard to navigation requirements during times of low flow would certainly indicate that it would be impossible to utilize this type of operation.

Further Professor Fuller testified,

> "The release of water from the Swift River during the dry weather period is worth a good deal to the power company at Thompsonville; that during the dry weather there is probably about 80 cubic feet per second which is let down the river in excess of what would come down under normal conditions; that is, the total let down is 110 cubic feet per second and the dry weather flow of the river goes, at times as low as 20 cubic feet per second, and he took it at 30 cubic feet per second, which leaves 80 cubic feet per second as the increase in dry weather flow." (Fuller, J. S. E. 56-57.)

This assumption was entirely refuted by the figures in Defendant's Exhibit 36 and Complainant's Exhibit 41 which demonstrate that it would be impossible to reduce the capacity of steam standby plants as suggested by Professor Fuller and estimated by him to be worth $80,000 by such regulation because during the critical low flows of the Connecticut River these Exhibits show that on many of the really critical days (averaging 29 days per year on Ex. D-36), water would have been diverted from the river and no increase added, so that it would still be necessary to have the same standby capacities.

Possibly this can best be illustrated by a specific example as shown on page 4 of Complainant's Exhibit 41. This shows that on November 18, 1924, the stage of the Connecticut River at Hartford was 0.0 indicating a very low flow and

yet on this critical day the river would have been subject to a diversion of 31 cubic feet per second even under the restrictions of the Secretary of War. Consequently there is no increase which can be relied upon to take care of the capacity of the plant during the dry weather flows. Increase of low flows is neither guaranteed under the legislation nor assured by the restrictions of the Secretary of War. There is, therefore, no saving in steam standby plant of 1,000 horse power as testified to by Professor Fuller (Joint Summary of Evidence 57) and as found by the Special Master's Report (page 21).

*Neither State nor its citizens can be compelled to accept money damages for loss of natural resources*

The Special Master having found that the "Massachusetts diversion of the Ware and Swift waters will cause an injury to the power of $80,000" (Report of Special Master, page 21) erred in finding that this Court could require "Massachusetts to pay to the power company or its assigns $80,000 if and when the power is developed to the extent stated." (Exception 42.) This property is property located in the State of Connecticut. The Commonwealth of Massachusetts has no authority through its Great and General Court to take property located in Connecticut. There is no authority residing in the legislative department of the United States to authorize one state to take property situated in another state, and no legislative power existing which can authorize the taking of this property unless it be that the State of Connecticut might authorize the taking of the property of its citizens for public use in the State of Connecticut.

8 Harvard Law Review 138.
New York City *v.* Pine, 185 U. S. 93.

Both of the Acts in question (Acts of 1926, Chapter 375 and Acts of 1927, Chapter 321, Mass. Reprint of Defendant's

Answer, Appendix B and C), make provision for an award of compensation to be made by the Courts of *that Commonwealth* but this provision only affects the citizens of another state when they either desire or are willing to have the question considered by the Courts of the Commonwealth of Massachusetts; but no matter what the effect of this legislation might be upon the individual citizens of another state, it certainly can have no effect so far as the sovereign power of another state is concerned. One state has no right by legislative enactment to force another sovereign state to accept damages for any injury to its sovereign rights; such a doctrine would deny the fundamental principles of sovereignty.

> "It is not lightly to be required to give up *quasi*-sovereign rights for pay; and, apart from the difficulty of valuing such rights in money, if that be its choice it may insist that an infraction of them shall be stopped."
>
> Georgia *v.* Tennessee Copper Co., 206 U. S., 230, 237.

*Natural resources cannot be taken from a state without its consent*

In our Exception 43 we claim the Special Master erred in finding that the natural resources of one state can be taken by another state and that this Court can require the payment of damages.

In *Hudson Water Company v. McCarter*, 209 U. S., 349, 357, it was said:

> "But it is recognized that the state, as *quasi*-sovereign and representative of the interests of the public has a standing in court to protect the atmosphere, the water and the forests within its territory, irrespective of the assent or dissent of the private owners of the land most immediately concerned."

And further at p. 357

> "It finds itself in possession of what all admit to be a great public good; and what it has it may keep and give no one a reason for its will."

In *Georgia v. Tennessee Copper Co.*, 206 U. S., 230, this is said:

> "This is a suit by a state for injury to it in its capacity of *quasi*-sovereign. In that capacity the state has an interest independent of and behind the titles of its citizens, in all the earth and air within its domain."

And in *Kansas v. Colorado*, 206 U. S. 46, 49,

> "One cardinal rule, underlying all the relations of the states to each other, is that of equality of right. Each state stands on the same level with all the rest. It can impose its own legislation on no one of the others, and is bound to yield its own views to none."

The facts in this case are entirely different from the situation in *New York v. Illinois and Sanitary District of Chicago*, 274 U. S. 488, in which the court stated, page 489,

> "But it does not show there is any present use of the water for such purposes which is being or will be disturbed; nor that there is any definite project for so using them which is being or will be affected. The waters are international and their use for developing power may require the assent of the Dominion of Canada and the United States. No consent of either is shown."

The case of *New Jersey v. Sargent*, 269 U. S., 328 cited by the Special Master in his report (p. 21), was a bill brought by the State of New Jersey against the Attorney General of the United States and members of the Federal Power Commission, alleging the unconstitutionality of certain portions of the Federal Water Power Act. The State of New Jersey alleged,

as part of its case, that under the conditions of the Act in question certain damages would result to contemplated power developments at sometime in the future. Concerning this allegation, the Court says (at p. 339) concerning the fact that certain applications had been filed with the Commission for the development of the water power resources:

> "As the applications are not further described, it must be assumed that the permits are sought, as the Act provides, 'for the sole purpose of maintaining priority of application for a license;' "

and the Court goes on to discuss the effect of these provisions complained of as follows:

> "These restrictions and conditions are assailed in the bill as passing beyond the field of Congressional power and invading that reserved to the State. But whether they are thus invalid cannot be made the subject of judicial inquiry until they are given or are about to be given some practical application and effect. *Naturally this will be after they become part of an accepted license*, and after some right, privilege, immunity or duty asserted under them becomes the subject of actual controversy." (Italics are ours.)

It will thus be seen, that the Court specifically states that in a situation such as this, where a utility has reached the point of having had its application for a power development presented to the Federal Power Commission and a permit issued thereon, and that permit accepted by the utility, any interference with the rights of the utility in the water so to be developed are such as constitute a proper subject for judicial inquiry and relief.

The records show in this case that not only is there a "definite project" which will be affected, but that a definite branch of the government, the Federal Power Commission, has investigated, approved and issued a permit for it. The facts in

*New York v. Illinois, supra,* were that it was an international stream and the water power companies at Niagara Falls were precluded under the international joint treaty from the diverting of any more water than was then being diverted for power purposes.

*An injunction should have been granted*

In Exceptions 45 and 46 we claim that the Special Master having found damages in Connecticut to the extent of at least $80,000, should have granted an injunction. In a damage such as this, which is of a recurring nature, continuing from year to year, monetary damage need not be accepted and no pecuniary standard need be set up. Injunction is, therefore, the proper procedure and remedy in such cases.

> Van Etten v. New York City, 226 New York, 483.
> Georgia v. Tennessee Copper Co., 206 U. S., 230.

> High on Injunctions, 4th Ed., p. 14, Sec. 9 . . . "But where the act complained of is such that by its repetition or continuance it may become the foundation of adverse rights equity may interfere by injunction altho no actual or substantial injury be shown."
>
> (p. 759), "Sec. 794 . . . . . As an incident to the ownership of the adjacent soil, a riparian proprietor has an interest of a usufructuary nature in the water flowing past his land, which equity will protect. This right or interest being common to all owners of land adjacent to a stream, no proprietor can, in the absence of a right to exclusive enjoyment, use the water in such manner as to injure adjoining proprietors. Nor can he, unless authorized by adjacent owners, divert the water from its natural course, to the injury of the owner below, or change its quality, or diminish its quantity, or cause it to flow back upon the proprietor above.
>
> * * * * *
>
> The jurisdiction of equity in this class of cases may be regarded as ancient and well established. It is

founded upon the pressing necessity of immediate relief being granted where, in the absence of such relief, permanent mischief and lasting injury might result, and also rests upon the necessity of preventing multiplicity of suits."

Holsman *v.* Boiling Spring Bleaching Co., 14 N. J. Eq. 335.

(p. 278) "Sec. 305. *Diversion prevented.* Since from the nature of the case, the injurious effect of a diversion of water, to the deprivation of him having the right to its uninterrupted flow, is necessarily vague and incapable of accurate ascertainment, and consequently not susceptible of satisfactory adjustment in an action at law, it is held that continuous diversion of water from its bed is of itself an irreparable injury."

Corning *v.* Troy, etc., Factory, 39 Barb., 311.
Crownen *v.* Wellsville Water Co., 3 N. Y. S., 177.
Amsterdam Knitting Co. *v.* Dean, 43 N. Y. S., 29, 13 App. Div., 42.

## VIII. AGRICULTURE

*Inundations of Meadow Land an Annual Occurrence*

It was found by the Special Master (Report of Special Master, page 20):

"The benefit from inundation of the 9,500 acres of hay land is exceptional."

In Exception 51, the Complainant objects to this finding of fact. The testimony of the owners of these meadows, who have used them for a great many years, shows that these annual inundations have been a regular part of the flow of the Connecticut River. Some of these lands have been in the family of the witnesses since 1701, even before Connecticut became a state. Rather than being "exceptional" these annual

floods or freshets have always been depended upon by the owners of the meadows as the sole fertilizer to furnish them with two crops of excellent hay each year. In many cases, it has been this natural fertility which has been the cause for acquiring these lands, and in addition, has been the cause, in at least one instance, of the land owner purchasing a farm in the vicinity of these meadows so as to derive the benefit he desired from this inundated land.

*Necessary to Lands along the River*

After reviewing the testimony, all of which showed the beneficial effect of these flood waters, the Special Master found:

> "The land owners who testified showed that the hay lands were not of uniform elevation; that sometimes small areas are not submerged resulting in a diminshed crop." (Report of Special Master, page 20.)

The record was complete in showing, both by the evidence of the land owners and by the expert testimony of Dr. Morgan, a soil expert, that the periodic flood waters of the Connecticut valley bear a silt which is valuable for fertilizing purposes. There are approximately 9,500 acres of hay land on the banks of the Connecticut River as well as 1,650 acres of land devoted to other crops, all of which land is covered by the annual inundations. Because of the fertilizing value of these inundations, these lands have been enhanced in value. It is not now nor never has been necessary to fertilize the land, but the fertility of the soil is solely dependent upon the reliability of the flood waters continuing each year. An exceptionally good quality of hay is grown on these lands without artificial fertilization, resulting in two crops a season of a quality of hay which can not be produced on the higher lands not subject to inundation, and Morgan found the quantity per acre to be in excess of the average yield per acre of all hay lands in Hartford County.

(J. S. E., page 80.) While the topography of the land is such that the land on the banks of the stream may be dotted here and there with knolls which sometimes in ordinary flood are not inundated, yet the higher the flood stages are, the more land is inundated; and not only that greater area is covered, but more of the beneficial silt is deposited, due to the deeper flows, and hence a better crop is obtained. The more water which covers the land actually flooded, the better the crops.

(Joint Summary of Evidence Carrier, page 58; Isaacson, page 60; Hale, page 63; Howe, page 65; Hanmer, page 66; Hardin, page 67; Dunham, page 68; Hollister, page 69; Goodrich, page 70; Adams, page 71; Christiansen, page 73; Newberry, page 74; Stipulation, page 75 and Morgan, page 76.)

*Higher Flows will be Decreased Materially*

The abstraction of these waters as proposed by the Massachusetts legislation, either with or without the restrictions of the Secretary of War, will materially reduce the height of the water during the period when the river is in flood or freshet stage.

The U. S. Weather Bureau fixes 16 feet on the Hartford gauge as "flood stage." It is when this height exists and when the gauge registers above this figure that Massachusetts proposes to divert the most water. At 16 feet and upward, the diversion will reduce the height of the water from 3 to 5 inches on the average and at times as much as 6.5 inches. (Joint Summary of Evidence, p. 29.) (Ex. C-6 and C-6A.) A reduction of 3 inches will materially affect the inundated land as well as reduce the area which would otherwise be flooded. (Morgan, J. S. E., page 78.)

These reductions may sometimes be sufficient not only to reduce the height of the water and the amount of area flooded, but to entirely prevent the flood by so reducing the flow of the stream that on certain days the water will be confined to the banks of the river or below the sixteen foot stage, as shown in Complainant's Exhibit C-6A during May, 1914; May, 1919; April, 1920; March, April and May, 1921; April, 1923; April, 1924; and February, 1925.

*Loss of Water means Loss of Fertilizing Material*

By the withdrawal of this water, the fertilizing material which would be brought down by the floods and deposited on the Connecticut River meadows will be materially decreased, since the fertilizing effect of these floods is dependent primarily upon the height of the waters over the land and the amount of land inundated. Testimony of Dr. Morgan (J. S. E., page 78).

*Damage to City Can and Is Being Eliminated*

During the trial of these proceedings, it was suggested that the floods which had such an exceptional value to the hay lands of the Connecticut valley may at other parts of the valley be causing damage. No testimony was offered in regard to this alleged flood damage, but reference was made to special acts of the General Assembly authorizing a bond issue for the construction of certain dikes in the South Meadows. The Mayor of the City of Hartford testified that

> "So far as any advocacy that he personally made in connection with the dike and its building, was predicated solely upon the desire of the present administration to see that the land was developed as an aviation center"

and he further testified

> "that there was nothing down on the South Meadows to protect until the development of aviation."
>
> (Joint Summary of Evidence, p. 83.)

Notwithstanding this, the Special Master found

> "It needs no testimony to prove that floods and inundations frequently cause damage. The Mayor of Hartford in this case showed dikes built at considerable expense in Hartford to fend off Connecticut river floods."
>
> (Report of Special Master, pp. 19, 20.)

To this finding of the Master we have objected in Exception 47. The Special Master should have found that dikes along the South Meadows were only in connection with the development of a landing place available for both land and sea planes.

Furthermore, the record shows that, insofar as any damage might be effected by floods, the city has already taken the necessary action for its protection in the future by the construction of these dikes.

*Injury to Inundated Lands is Material*

The Special Master found

> "On the whole I think the damage to the hay land is not shown to be of 'serious magnitude'; and that such damage, far from being 'established by clear and convincing evidence,' is shown by no evidence making it possible of computation or proving that it is large."
>
> (Report of Special Master, p. 20.)

In Exceptions 48, 49 and 50 to the Report of the Special Master we claim that the evidence shows that the agricultural

land in the Connecticut Valley will be materially damaged by the proposed diversions.

The stipulation (J. S. E., p. 76) shows 9,500 acres of hay crops actually dependent upon the flood waters of this river for fertilization. In addition to lands which are used for hay there are other crops being raised in the valley on these lands which are inundated annually. Such other crops include 750 acres of tobacco, about 480 acres of corn, about 250 acres of vegetables, 142 acres of pasture, and 28 acres of potatoes. (J. S. E., p. 77.)

The testimony shows that farmers depend and rely upon the right to so utilize these flood waters and if this right is taken away that they will not be able to use the land in the same economical way as they are now doing and as has been done in the past for many years. In fact testimony shows the use of these meadows since 1701. (Hale, J. S. E., p. 63; Goodrich, J. S. E., p. 70.)

There was also testimony by individuals that this damage would be considerable to each of them. The stipulation further states that other farmers owning land in the Connecticut valley were present in court and prepared to testify as to the damage which they would sustain.

*Amount of Damage in Dollars Immaterial*

The Special Master found

> "The benefit from inundation of the 9,500 acres of hay land is exceptional. The amount of injury to the hay crop likely to result from the Swift and Ware diversion was not proven,—probably is not capable of proof—and was left to conjecture. How much hay land would fail to be submerged because of the diversion is quite uncertain."
>
> (Report of Special Master, p. 20.)

This finding was contrary to the weight of evidence given by the farmers who had testified to the fact that the hay had been grown without fertilization for many years because of these flood waters; that they would not own the property but for its location and the flood benefits which it received; that they had bought their land with this in view; and that, in some instances, they specified the number of acres which would not be flooded in the event that this taking was permitted.

(Joint Summary of Evidence

William H. Carrier ..... page 58
Edward A. Isaacson ..... " 60
Stancliff Hale ..... " 63
Lewis W. Howe ..... " 65
Alfred W. Hanmer ..... " 66
Raymond A. Hardin ..... " 67
William R. Dunham ..... " 68
George A. Hollister ..... " 69
Charles E. Goodrich ..... " 70
William W. Adams ..... " 71
Andrew Christiansen ..... " 73
Harold M. Newberry ..... " 74
Stipulation ..... " 75
Dr. Mont Francis Morgan ..... " 76)

For these reasons we object in Exception 51 to the findings of the Special Master.

The Special Master should not have held that it was incumbent on the Complainant to show the money value of the amount of damages to this land. It was sufficient that Connecticut proved that the action of Massachusetts would cause material damage. It was just such an invasion of rights as the taking, from these farmers, of the benefits of flood waters, which the courts have uniformly held both in Connecticut and in Massachusetts is entitled to relief in a court of equity.

Water Commissions *v.* Perry, 69 Conn., 461.
Wellington *v.* Rawson, 231 Mass., 189.

The question of the degree of actual damage which will be caused by the diversion has no application in such a case. The injury has been proved to exist; it should be corrected; and the question of damage or the amount of damage is not material. This case comes within the rule stated by this Court in *Georgia v. Tennessee Copper Co.*, 206 U. S., 230, 237:

> "It is not lightly to be required to give up *quasi*-sovereign rights for pay; and *apart from the difficulty of valuing such rights in money*, if that be its choice, it may insist that an infraction of them shall be stopped." (Italics ours.)

*The Right of Landowner is a Property Right*

As set forth in Exception 52, the Special Master failed to hold that the rights of the riparian owners to these flood waters are property rights protected by the constitutions both of the State of Connecticut and of the United States. The use of flowing waters exists solely because it is an incident to the ownership of real estate along the banks of the stream and constitutes a vested property right.

> Hollister *v.* Union Co., 9 Conn., 435, 443.
> Johnson *v.* Jordan, 43 Mass., 234, 239.
> Carey *v.* Daniels, 46 Mass., 236, 238.

This right to the use of waters of a flowing stream must be interpreted as applicable to all of the water which nature has supplied to the stream, and therefore includes the flood waters. It is not limited to the amount of water which flows in the stream in any one season of the year or any one year or an average of a number of years. Whether it be during periods of low flow or periods of high flow or of intermediate flow, a riparian owner is entitled to use of all of the water. The use of the flood waters for the irrigation and fertilization of the soil is an accepted riparian use. In Connecticut flood

waters occupy in its judicial decisions a class by themselves; and the Supreme Court of Connecticut has specifically said that a riparian owner is entitled to these flood waters to the same extent to which he is entitled to the use of any other flows of the stream.

Thompson *v.* New Haven Water Co., 86 Conn., 597.

It was claimed in this case that the acts of the plaintiff were *damnum absque injuria*. The Court said, page 608:

> "We thus have a situation in which the plaintiff was damaged *in his property* by an act of the defendant in interfering with the natural flow of the flood water, which had no justification in the *improvement, use, enjoyment*, or *protection of its land*. Damage done under such circumstances, cannot, *with due regard for property rights*, be regarded as *absque injuria*. (Italics are ours.)

In Massachusetts, while this distinction is not so marked, the courts have held that the flow of the stream to which riparian owners are entitled includes all of the waters flowing by nature, including the flood waters.

Nemasket Mills *v.* Taunton, 166 Mass., 540, 544.

*Must be Legislative Act to take this Property Right.*

The only way that these property rights can be acquired is by proper legislative act authorizing the exercise of the power of eminent domain. There has been no legislative action by any competent sovereign authorizing the taking of these rights in Connecticut, and until such action has been taken the only relief is by injunction. The Special Master should have held that these property rights cannot be taken from their owners in Connecticut by a legislative act of the Commonwealth of Massachusetts without the consent of the legislature of the

State of Connecticut, because the legislative authority of the Commonwealth of Massachusetts cannot be extended beyond its boundaries for the acquisition of property in another state, either for a public or a private purpose.

In Exception 53 we object to the failure of the Master to recognize that the use of the waters of the Connecticut River which have always been in actual and beneficial use by Connecticut citizens is a property right which can only be taken from the owners by some competent legislative body. The Great and General Court of the Commonwealth of Massachusetts is not such a body.

## IX. POLLUTION

*Scope of investigations*

Dr. Charles E. A. Winslow and Dr. Willem Rudolfs co-operated in conducting an exhaustive analysis of the Connecticut River during the period from July 8 to September 14, 1929, and from June 17 to November 18, 1928, the purpose of which was to obtain a study of the conditions existing in the river, both from a bacteriological point of view and also with reference to the dissolved oxygen content of the stream. The quantity of domestic sewage and industrial waste which can be assimilated safely by any stream is in direct proportion to the percentage of the dissolved oxygen in that stream.

In connection with this survey there were established sixteen sampling stations on the river, located at points from the Massachusetts-Connecticut state line to the Saybrook Bridge at the mouth of the river; samples were collected and analyzed during these periods in 1928 and 1929. Some idea of the comprehensive character of these activities may be gleaned from the general summary of them.

During the 1928 period samples were taken from the river at two of these stations every hour and a half for several days, night and day. Curves were plotted based upon the results obtained from these analyses to determine which hour of the day or night the river would ordinarily indicate the average conditions. For the remainder of the period, samples were taken from two stations on the river every day at the hours (varying from eight to twelve in the morning) indicated as representing average conditions.

During the 1929 period a similar survey was made for ten days, a sample being taken from the stream every hour and a half. It was found then that average conditions would be obtained from samples collected at 8 o'clock in the morning (Rudolfs Joint Summary of Evidence, p. 1161), and samples were taken every day during the period.

The general purpose of the investigation from the public health standpoint was (Winslow, Joint Summary of Evidence, p. 86) "to determine the character of the water at the Massachusetts-Connecticut state line, to see how polluted it was, with a view of determining a possible effect thereon of alterations in the flow of the stream." Professor Winslow said that "as far as these bacterial counts are concerned, his results would indicate whether the water was suitable for bathing and whether it was suitable for drinking, either as it stands or with subsequent treatment."

Dr. Rudolfs testified that his investigations comprised mainly three tests significant of the pollution characteristics of the stream (Joint Summary of Evidence, p. 97), namely, dissolved oxygen, biochemical oxygen demand, and bacteriological examinations. He testified that in addition, "more complete chemical tests of the water were made at less frequent intervals; that two forms of pollution were considered, one coming from human beings, domestic sewage, and the other

pollution coming from industries, industrial waste: that the investigation included domestic sewage, industrial sewage and sludge deposits in the stream."

In order to insure obtaining average conditions across the stream, Dr. Rudolfs testified (Joint Summary of Evidence, p. 98) that "three samples across the river at mid-depth" were collected. He went on "if but one sample was taken, say in the middle of the stream, the velocity and the volume of water might be different from the places nearer to the banks," consequently samples were taken of the water at points in the cross-section of the river "so that there were three samples across the stream and all taken at mid depth . . . . the samples were taken at mid depth because if they were taken near the surface the conditions might be a little better than the average due to re-aeration conditions; that if they were taken close to the bottom the results would be a little worse because there might be a sludge deposit and the oxygen demand might be greater than the average of the stream."

*Present condition of river at Connecticut-Massachusetts state line*

Dr. C-E. A. Winslow, who has been quoted extensively by the defendants and by the Special Master, questioned as to the ability of detecting by laboratory analysis the precise effect of the proposed diversions upon the Connecticut River, testified as to the present conditions as follows (Joint Summary of Evidence, p. 92):

> "A. Yes, I think the Connecticut River at state line in the autumn of a fairly average year is what I call on the border line of nuisance."

This portion of Dr. Winslow's testimony was omitted from portions quoted by defendants and by the Special Master.

This conclusion was reached from a study of the analyses made from samples taken from the river at the Connecticut-Massachusetts state line during 1928 and 1929. These analyses disclosed *actual present conditions* before any water has been removed.

He testified (Joint Summary of Evidence, p. 88) that in 1928, the flows remained throughout pretty high; that it was one of the wettest summers in history in the twenty-four years during which there is a record, and his impression was that it was somewhere between 50 and 60 per cent above the average; but in 1929, which was the year when the stream flow was very slightly below the average, there was a different picture. While the average for the period investigated during 1929 showed only 54% saturation, in seventy-nine different instances there were individual cases of saturation below 50%. On July 27 there was a value of 28% registered; on August 13, a value of 26%; September 4, values of 28%, and 27%; and on September 10, 16% and 18%.

Dr. Winslow states (Joint Summary of Evidence, p. 89), that the really significant results of the sampling are shown in Exhibit C-18 compiled by Dr. Rudolfs because it shows the result by days. He thinks in a case of this kind averages are likely to mislead a little because if a nuisance is created through a certain week or month, even if general averages are good, it is a real fact. The crucial time is in the fall when the river flow is low and at that time as Exhibit C-18 indicates, in 1929, in the first ten days of September the oxygen was so low as to be oscillating back and forth pretty close to the demand for oxygen; in other words, during that ten days the stream was in a border line condition in which any substantial removal of oxygen or water containing oxygen would have thrown it completely over the line and that was the time when these results of 16, 18, 24, and 26 per cent saturation were obtained.

His experience has indicated that if the condition is as close to the line as that, that at certain points of slow flow and shallow water and sludge, there is likely to be a serious nuisance; that is why he feels justified in saying that a dissolved oxygen content much below 50% saturation indicates rather a "ticklish situation" and certainly any substantial removal of oxygen above that present would, during a period such as this, have pushed over the line, exhausted the oxygen completely and produced a real nuisance.

Dr. Rudolfs, another expert witness for Connecticut, who compiled the Exhibit C-18, which Dr. Winslow discussed, testified (Joint Summary of Evidence, p. 100) that during the period July 8th to September 14th, 1929, the percentage of oxygen saturation was from 20 to 29% upon one day; eight days from 30 to 39%; sixteen days from 40 to 49%; twenty days from 70 to 79%; and one day from 80 to 89%; that the average for the whole period was 54% saturation; that the number of days the saturation was below 50% was as follows: Out of sixty-nine sampling days 25 times or 36% the saturation was below 50% or a little over one-third of the time; that he found from these studies (Joint Summary of Evidence, p. 108), that at the present time the water at the state line is just on the border line.

The Special Master erred and mistook the law in failing to find that Massachusetts has no right to pollute the waters of an interstate stream to such an extent that they are delivered to the State of Connecticut at the state line in such condition as to be unsafe for bathing and so near the border line that any appreciable diversion therefrom will make the stream become a nuisance, and that so long as the stream remains in such polluted state water can not be diverted from it by the state responsible for the polluted and dangerous condition. (Exception 56.)

During this period in 1929 the average flow of the Connecticut River at the Connecticut-Massachusetts state line was 5,050 cubic feet per second (Joint Summary of Evidence, p. 106) which is substantially equivalent to a height of 2 feet on the Hartford gauge (Exhibit C-25-a).

As will be observed, the Connecticut testimony concerning conditions as they are actually at present is based upon actual observations taken each day, while all the Massachusetts testimony was based on monthly averages. (Weston, Joint Summary of Evidence, p. 128, Exhibit D-8, Exhibit D-9.)

The misleading results which may be obtained from the use of monthly averages particularly as compared with daily results has already been commented upon in referring to Dr. Winslow's testimony.

*Slight decrease of oxygen will tend to create nuisances*

We have just discussed, in reviewing the testimony of Dr. Winslow and Dr. Rudolfs, the critical condition which actually exists a substantial portion of an average year when the flow of the stream approximates an equivalent of 2 feet on the Hartford gauge, also that at such a time any substantial reduction in the flow of the stream will have undesirable results and will create an actual nuisance.

Dr. Rudolfs stated (Joint Summary of Evidence, p. 102), that odor nuisances begin to occur if the oxygen content is nearing exhaustion even if there are no sludge banks present. He also states that where there are sludge deposit beds, these deposits will come above the water line when there is very low water and are susceptible to decomposition. Naturally under such conditions the bacteria present in the sludge beds continue to work and all kinds of foul odors occur. (Joint Summary of Evidence, p. 97.) This working of sludge beds

and production of odors are accompanied by ebullition of gas rising from the sludge beds, indicating active decomposition and putrefaction. He further states that during the period when they were making surveys to determine the existence of sludge beds in the river, they found that there were sludge banks partly exposed on days of low water. (Joint Summary of Evidence, p. 108.)

*Sludge beds*

Dr. Rudolfs testified (Joint Summary of Evidence, p. 97), that his investigation had included the existence of sludge beds in the Connecticut River. Sludge deposits are composed of human and industrial wastes which are heavier than water and when the velocity of the stream is insufficient, these settle out forming first in quiet places and around bends as slight deposits which accumulate later on; that the first deposits usually occur below sewage outlets. If there is very low water, the sludge deposits will be uncovered and come above the water line causing odor and nuisances. These sludge beds take out a large volume of oxygen which would otherwise be available to meet the demand of the soluble sewage in the stream.

His survey disclosed the fact that the sludge deposit at the state line in October 1929 was about 310,000 square feet with the average of about 1.4 feet in depth, or a volume of 435,000 cubic feet; that the volatile solids amounted to about 1,000,000 pounds with a biochemical oxygen demand of 108,400 pounds with a population equivalent of 500,000 to be satisfied from the water in the river.

In 1929 he made two surveys to determine the existence and extent of these sludge deposits, one in the spring and one in the fall. He found that there was a substantial increase

in the size of these deposits during this period. For instance, using the sludge beds at Springfield at the lower bridge as an illustration, the area in early summer, in June, was 104,900 square feet and in the fall 178,000 square feet. The biochemical demand in the summer was 54,950 pounds and in the fall was 64,950 pounds. These figures indicate an accumulation of sludge deposited in that vicinity with a definite increase in oxygen demand during the summer months from June until the beginning of October. (Joint Summary of Evidence, p. 107-108.)

He testified (Joint Summary of Evidence, p. 120) as to the effect of the velocity of the stream flow upon sludge deposits. If the velocity of the stream is not sufficient sludge beds will grow; and they are most apt to grow at the time of year when the flow is less; they are most apt to disintegrate to some extent if the velocity of the water increases materially which would probably be in the spring when there is a high water.

Mr. Robert Spurr Weston, an expert witness for Massachusetts, while suggesting that the sludge beds depositing on the bottom in the summer months and staying there are possibly of a little benefit in retarding the amount of demand which might be created lower down, concedes the fact that when the stream flow is higher some of the sludge beds go down stream. (Joint Summary of Evidence, p. 129.)

*Bathing*

Dr. Winslow testified that the standards of water for bathing established by different observers and different State Commissions vary from 4 to 30 colon bacilli per cubic centimeter, and numbers of B. coli in the Connecticut River is many

times greater than even the highest of these standards and is distinctly unsafe for bathing. (Joint Summary of Evidence, p. 89.)

Dr. Rudolfs testified that in regard to bathing the river is polluted and is dangerous. (Joint Summary of Evidence, p. 108.)

*Water supply*

Dr. Winslow stated that obviously the Connecticut River is not suitable for drinking without treatment, but that it would be possible to purify the Connecticut River water for drinking purposes providing storage, filtration and chlorination were provided but that it is beyond the limits generally considered safe for treatment by filtration and chlorination alone. (Joint Summary of Evidence, p. 87.)

Dr. Rudolfs agreed that at the present time it would need considerable treatment before the water could be used as a water supply but that it could be used by treating it. (Joint Summary of Evidence, p. 108.)

In this connection the testimony of Gen. Sanford H. Wadhams, Director and Commissioner of the State Water Commission of Connecticut, is important. General Wadhams stated that his Commission had been charged by law with the duty of making a survey of the water resources of the State of Connecticut. He stated that up to the present time that this work had been substantially accomplished and that this Commission was satisfied that with the limited sources of supply now existing in the State of Connecticut for future development it was inevitable that the streams of the State must be purified so that they might be available for domestic supply by some of the cities in the State.

With regard to Hartford in particular the General stated that the last session of the General Assembly of Connecticut created a Metropolitan District at Hartford consisting of that city and five other adjoining towns all united in the supply of essential public utilities such as, water, sewage disposal and a few others; that the same General Assembly refused the request of the City of Hartford to take a water supply from a source other than those now in use and that he thinks that Hartford will be the first city that will have to consider using the Connecticut River as a water supply. (Joint Summary of Evidence, p. 146.)

*Connecticut River as compared to other streams*

Dr. Winslow prepared data concerning the analyses throughout the country of various streams which were in actual use or proposed to be used for public water supplies, comparing the condition of these streams with that of the Connecticut. In almost all of the figures other than those for the Connecticut River the total colon group is included. If the true B. coli only had been determined the results would have been lower and the bacterial content of the Connecticut so much higher by comparison. Had there been included all of the bacterium coli count which is usually used in the study of water supply, the results on the Connecticut River would have been higher; these results are given both for colon bacilli per cubic centimeter in one column and colon bacilli per 100 cubic centimeter in the second column; the reason for this is because Massachusetts Board of Public Health use the latter in reporting analyses of its streams, including the Merrimac River at Lawrence.

(Page 95, Joint Summary of Evidence)

| | *Colon bacilli per cubic centimeter* | *Colon bacilli per 100 cubic centimeter* |
|---|---|---|
| Mississippi, above Minneapolis .. | 13 | 1,300 |
| Maumee, at Toledo ..... | 20 | 2,000 |
| Allegheny, at Pittsburgh ..... | 21 | 2,100 |
| Ohio, at Louisville ..... | 22 | 2,200 |
| Grand, at Grand Rapids ..... | 26 | 2,600 |
| Delaware, at Trenton ..... | 29 | 2,900 |
| Ohio, at Cincinnati ..... | 30 | 3,000 |
| Mississippi, at St. Louis ..... | 31 | 3,100 |
| Maiden Creek, at Reading ..... | 42 | 4,200 |
| Merrimac, at Lawrence ..... | 42 | 4,200 |
| Mahoning, at Youngstown .... | 54 | 5,400 |
| Schuylkill, at Philadelphia ..... | 59 | 5,900 |
| *Connecticut, above Hartford** .. | *68* | *6,800* |
| Missouri, at Kansas City ..... | 159 | 15,900 |
| Hudson, at Albany ..... | 194 | 19,400 |
| White River at Indianapolis .... | 225 | 22,500 |
| *Connecticut, at the State Line ...* | *378* | *37,800* |

*Population capacity*

The population capacity of a stream affords a convenient way of measuring the effect of water diverted from or added to the flow. Witnesses testified that it would be impossible to detect, by the ordinary means afforded by laboratory analysis, the effect on the chemical and bacteriological characteristics of the stream of the diversions proposed by Massachusetts, yet this effect may be estimated and expressed in terms of population capacity.

Defendants offered Exhibit D-14 entitled "Summary of Computations from Analytical Data Showing Population Capacity of Connecticut River at State Line, *and Estimated Effect of*

* The Connecticut above Hartford is the best point in the river.

*Swift and Ware River Diversions and Releases,* as Authorized by the Massachusetts Legislation and as Modified and Restricted by the War Department Regulations." (Italics ours.)

Earl B. Phelps, an expert witness for Massachusetts, testified (Joint Summary of Evidence, p. 130):

> "That the population capacity of the stream is its oxygen balance expressed in terms of population; that Dr. Rudolfs has told how it is possible to evaluate the sewage and other wastes of a given population in terms of oxygen and he has made use of that principle to express his industrial wastes in terms of equivalent population; that it is found convenient to carry this process one stage further and to express the oxygen equivalents determined by analysis of the waters likewise in terms of population; . . . . . that population capacity of the stream, therefore, is its ability to provide for the wastes of a given population during the time of passage to salt water and under the temperature conditions existing . . . . . it represents in brief the reserve capacity of the stream to care for additional pollution over and above that which it now contains and to carry that pollution to the sea without the production of a resulting nuisance."

Robert Spurr Weston, an expert witness for Massachusetts, testified (Joint Summary of Evidence, p. 124):

> "Population capacity means the capacity which a stream has of oxidizing the pollution produced by population in terms of the number of population; for example, the population capacity of 1,000 means the ability of the stream to care for the sewage produced by 1,000 people or the industrial waste equivalent to 1,000 people."

Exhibit D-14 shows the population capacity of the Connecticut River at the State Line expressed in terms of monthly

averages. Some days would be higher than the average and some lower. As a corollary, some weeks would be higher than the monthly average and some lower.

The population capacity of the stream by definition presupposes that when this capacity is reached, by the imposition of a certain population equivalent on the stream, that there is no oxygen left. In other words, Exhibit D-14 shows that for the month of August, 1929, the population capacity of the Connecticut River at the State Line was only 368,000 persons. By definition, if the pollution load from a population of 368,000 had been imposed upon the stream during that month it would have exhausted all the available oxygen and the stream would have reverted to an open sewer.

Exhibit D-14 shows that for the three months, namely, July, August and September, 1929, the population capacity of the Connecticut River at the State Line was as follows:

| | |
|---|---|
| July | 649,000 |
| August | 368,000 |
| September | 416,000 |

The present population equivalent load on the Connecticut River at the State Line is 619,000 (Rudolfs, Joint Summary of Evidence, p. 105).

Exhibit D-14 shows in column five that the percentage change in flow, by reason of diversion or release as proposed by Massachusetts, varies from an addition of .9% in August, 1929, to a subtraction of 2.8% in March, 1929. Within the range of these small percentages of additions or subtractions from flow, the population capacity of the stream can be affected by as much as 2,410,000 persons. This means that even

though the diversion be a relatively small percentage of the total flow of the river, the effect, when expressed in terms of population capacity, can be substantial.

Exhibit D-14 shows that in 1929, during the months of July and November, months in which low flows of the river commonly occur, the effect of the diversions, even as restricted by the War Department regulations, is a subtraction from the population capacity of the stream. The population capacity is also an indication of the border line situation which exists with respect to nuisance conditions. The same stream which has a population capacity of 144,760,000 in the month of April, 1929, is reduced by conditions of temperature and low flows to a figure of 368,000 in August. It has proceeded far toward the depletion of its oxygen reserves.

Robert Spurr Weston testified (Joint Summary of Evidence, p. 128):

> "That it would be possible to give it (the Connecticut River) more carrying capacity in the summer than it now has, by as much as 100 percent."

Dr. Charles-E. A. Winslow testified (Joint Summary of Evidence, p. 89):

> "That it is perfectly true that if there is any oxygen present in a given volume of water at a given moment there will not be any nuisance unless there is a sludge bank underneath it; but that his experience indicates that if the condition is as close to the line as that, that at certain points of slow flow and shallow water and sludge there is likely to be a serious nuisance, that is why he feels justified in saying that a dissolved oxygen content much below 50 per cent saturation indicates rather a ticklish situation and certainly any substantial removal of oxygen above that present would, during a

period such as this, have pushed the thing over the line, exhausted the oxygen completely and produced a real nuisance."

*Sources of pollution*

Dr. Rudolfs testified that a survey had been made of the Connecticut River, extending into Massachusetts, Vermont, and New Hampshire, to determine the quantity of domestic sewage and industrial wastes contributed to the river above the Connecticut-Massachusetts state line; he found that very little industrial waste comes from New Hampshire and Vermont and that by the time it reaches the state line it is all oxidized; the bulk of the sewage and waste is discharged into the Connecticut River by the towns of Holyoke, Chicopee and Springfield, with a considerable quantity coming from the Chicopee River which is a tributary coming in just above Springfield, all of which is within the Commonwealth of Massachusetts. (Joint Summary of Evidence, pgs. 105 and 106.) Dr. Winslow found that the sewage from the city of Springfield is the principal and immediate source of pollution, finding its way along down the east bank of the river. The results are that in their work they "always found that the worst condition was at the east side of the river and then the middle and then the west bank; the same thing would be true with reference to the sewage of other cities discharging sewage into the stream." (Joint Summary of Evidence, pgs. 88 and 89.)

*Improvement between Connecticut-Massachusetts state line and Hartford*

It appears from the testimony of Dr. Winslow (Joint Summary of Evidence, pgs. 94 and 95), that the Connecticut River just above Hartford is the best point in the river from a bacteriological standpoint; the reason for this is explained by the fact that the water improves very rapidly immediately below the state line, resulting from storage in the pool back

of the dam at Thompsonville, and aeration where the water flows over the rapids just below the dam. Dr. Rudolfs testified that there is a dam about 6 to 7 feet high at Enfield and below the dam there is a stretch of about a mile and a half of ripples over which the water at low flow is reaerated very vigorously (Joint Summary of Evidence, page 115). Dr. Winslow testified that were it not for this condition at the Enfield dam, the conditions at Hartford would be very much more serious than they are at present. Dr. Rudolfs testified (Joint Summary of Evidence, p. 115) that with the construction of the proposed new dam at King's Island, while it will continue the pondage, it will remove entirely the benefit derived from the mile and a half of ripples or rapids now existing below the dam because they will be covered.

*Effect of the diversions*

a. *War Department restrictions do not necessarily affect pollution*

If it is to be considered that the restrictions imposed by the War Department are of any benefit so far as the sanitary condition of the Connecticut River is concerned, it must be remembered that these restrictions are not invoked for the purpose of making the Connecticut River more sanitary, but for the sole purpose of protecting its present navigability. If these improvements are to be considered as material, their permanency will depend entirely upon whether or not the War Department may see fit to continue its present ruling. This is not guaranteed, in fact the War Department specifically states that whatever it has decreed is subject to further order, after the consideration of additional data. If Massachusetts wishes to take the position that it intends to improve the condition at the Connecticut-Massachusetts State line, even though slightly, by the release of water in excess of the natural low of the stream during low flow, this benefit should not be made to depend upon what the War Department does

for the purpose of navigation; this benefit should be provided for by modification of the Massachusetts legislation or else in a decree of this Court.

b. *During high flow*

It has already been stated elsewhere that when the Hartford gauge stands at flood stage, there will be an average reduction in height of water of between three and five inches; at times the reduction will go as high as 6½ inches. There will always be a diversion, in varying amounts, whenever the Hartford gauge is in excess of 2.1 feet; the periods when the spring freshets are of most benefit to the river in disintegrating and removing the sludge beds as suggested by Dr. Rudolfs and Mr. Weston, will always be depleted by these diversions and to that extent will have an adverse effect on the sanitary condition of the stream.

c. *During low flow*

As Dr. Winslow and Dr. Rudolfs have testified, the actual condition of the river during the time of low flow in an average year is on the border line where removal of water from the river will cause nuisance.

Much has been made of Dr. Winslow's testimony by the Special Master, where he appears to have taken the position that a 2% diversion of the flow of the Connecticut River will have no appreciable effect on the condition of the stream. In the first place, Dr. Winslow did not pretend to be an hydraulic engineer and his assumptions are based upon the fact that during the period of low flow, particularly when the gauge height at Hartford is approximately 2 feet, that there will always be some contribution from Massachusetts over and above the condition of the stream that would naturally flow; what Dr. Winslow did say was that this 2 per cent would prob-

ably not be susceptible of precise determination by laboratory analysis which is somewhat different from saying that the reduction of 2 per cent of the flow will have no effect on the stream, whether it can be mathematically disclosed from an analysis or not. Dr. Rudolfs stated that from a chemical standpoint any amount of oxygen added to or taken from the water of streams would add to or detract from the quality of the water and cited as an example that the diversion of 150 cubic feet per second would be equal to the reduction in population capacity of 37,000 people and that each cubic foot per second taken out or added would make a corresponding decrease or increase of the population capacity of the stream of 1/150th of 37,000 people or approximately 240 people. In view of the fact that much has been made of the idea that up to at least 5% and possibly 10% of the flow of the stream is needed to change the sanitary conditions during periods of low flow, it might be claimed that the suggestions of the War Department are practically of small moment, so far as compensating Connecticut is concerned, for what is essentially a continuous abstraction of the water from the river during the whole year. It is worthy of consideration that if Massachusetts desires to compensate for this continual diversion of water from the river, the least it could offer would be an amount of release which even they could claim to be of sufficient quantity to be analytically determinable as a benefit to the quality of the stream.

*There will be actual diversion during low flow*

As already shown (Navigation Supra, page 87), the Special Master has proceded upon the assumption that during periods of low flow there will *always* be an addition to the natural flow of the stream by release from the Swift River dam, due to the restrictions of the War Department, and that during this time there would be no diversions. This assumption is not

correct; Exhibits C-41 and D-36 show that during more than 40 per cent of the time when the Hartford gauge is at 2 feet (mean low water) or below, actual diversions will take place even under the restrictions of the War Department. (Exception 54.)

During the period testified to by Dr. Winslow in 1929, when he found the stream to be upon the border line as a general thing, and on many specific instances found that it was below the danger line, and when Dr. Rudolfs found upon his investigations for sludge beds that these were actually exposed at certain times during the period, the average flow of the stream averaged 5,050 cubic feet per second or 2 feet on the Hartford gauge. Thus when even now the water is not adequate to properly safeguard the stream from becoming a nuisance, there would actually be diversions from the water naturally flowing.

*Future effects of the diversion*

Dr. Winslow testified that assuming the normal growth of population and industry between the state line and Holyoke, there will be an increased demand upon the water for oxygen during the next 10 years; that the more sewage and industrial wastes put into the river, the more oxygen is needed to take care of it (Joint Summary of Evidence, page 91); he also stated that this danger can practically be eliminated if the Massachusetts cities along the river adopt sewage disposal plants to take care of this pollution (Joint Summary of Evidence, pages 97 and 96). However, it is to be remembered that under the statutes of Massachusetts, the Connecticut River is exempt from the jurisdiction of the Board of Public Health and the Special Master advises that there is no indication that the policy of Massachusetts in permitting its streams to remain polluted will change. Dr. Rudolfs has graphically set forth the future condition of the Connecticut River up to and including the year 1970, without diversions (page 106, Joint Summary of Evidence).

| *Year* | *Equivalent Population* | *% D. O. Saturation* | *D. O. P. P. M.* |
|---|---|---|---|
| 1929 | 750,000 | 56 | 4.9 |
| 1940 | 900,000 | 50 | 4.4 |
| 1950 | 1,080,000 | 45 | 3.96 |
| 1960 | 1,290,000 | 41 | 3.61 |
| 1970 | 1,540,000 | 37 | 3.26 |

*Water policy of Connecticut as to pollution*

In Exception 55th to the Special Master's Report, it is claimed that the Master erred in finding, with respect to the policy of the State of Connecticut as to the preservation of the purity of its water sources, that it was not different from that of Massachusetts.

The Master failed to take cognizance of present conditions and the present practice of the State of Connecticut as testified to by Brigadier-General Sanford H. Wadhams, Director and member of the State Water Commission.

General Wadhams testified that the State of Connecticut, through the State Water Commission, is embarked on a program aiming to correct and prevent the pollution of the streams of the State.

He testified that the State Water Commission was created by "Chapter 143 of the Public Acts of 1925, entitled 'An Act Concerning the Pollution of Water and creating a State Water Commission.'" He testified that under the law his Commission is charged with the elimination of the pollution of the waterways of the State, under very broad authority. The Act prohibits any new sources of pollution which might come into existence after the passage of the Act.

He pointed out that the functions of the State Water Commission and their interest in matters concerning pollution

were based fundamentally on the economic aspects of the problem in contrast to the interest in the same problems of the State Department of Health, which is concerned primarily with conditions menacing the public health.

He testified that the reason for the Commission's existence is that even prior to the time the Commission was created "industry was becoming hampered for the want of the necessary water of the proper quality and sufficient quantity; that in other words, the economic development of the State of Connecticut was approaching the saturation point," because of the limitation of water resources.

He said that the population of the State of Connecticut was increasing and "the population curve shows a steady year by year rise; — that all over the State of Connecticut practically every city of any size in the State is at the present time reaching out in an effort to develop additional sources of water." He said that engineers declare that all of the available clean water resources of the State are already developed. In consequence of the imminence of the water conservation problem, the State Water Commission has taken up with officials of the communities throughout the State the necessity of formulating a program for treating their sewage before it is discharged into the waterways of the State.

The State Water Commission has been successful in its efforts and "it may be said almost without reservation that every community of any considerable size in the State of Connecticut is engaged at the present time in some stage of the process" of formulating a program for the treatment of its sewage.

The City of Hartford has adopted a program which commits it to an expenditure in excess of $3,000,000.

The program of the State Water Commission contemplates that every community now discharging sewage into the river will be required to treat that sewage.

The State Water Commission is further engaged in making a comprehensive survey of the water resources of the State of Connecticut.

The Commission has a vital interest in the proposed diversion of the Ware and Swift Rivers because it is not only Massachusetts that proposes diversions from Connecticut streams but other neighboring states are looking "with longing eyes" towards certain interstate streams. (Joint Summary of Evidence, p. 145.) The conservation of the water resources of the State means a cleaning up of the streams in Connecticut for the purpose of future water supplies and in the comparatively near future it will be necessary for cities and towns in Connecticut to go to the larger streams, interstate streams such as the Farmington, Connecticut, and Quinebaug Rivers as sources of domestic water supply. If the State of Connecticut continues to grow and develop, the likelihood of the use of these large rivers for water supply will become an assured fact. Hartford will be the first city that will have to consider using the Connecticut River. (Joint Summary of Evidence, p. 146.)

The testimony of General Wadhams shows that Connecticut has a forward-looking policy of conservation of water resources involving modern scientific means for the preservation of their purity, that the cities of Connecticut are preparing for the use of their large rivers for water supply purposes.

In view of this undisputed testimony the Special Master erred in finding that Connecticut's practice with respect to pollution of rivers is not different from that of other New England States. The policy of Connecticut is distinctly

opposed to that of New Hampshire, for example, where the rivers are used as drainage arteries as a matter of well-understood policy. It is different from Massachusetts, where the large rivers, the Merrimac and Connecticut, are exempted from the jurisdiction of the Board of Health. In Connecticut no stream is exempt from the regulation and conservation of the State Water Commission. Not only does Connecticut not accept the Massachusetts point of view that the Connecticut River is to receive the raw sewage of the cities along its banks but it has definitely served notice on Connecticut cities now polluting the river that each must take steps to terminate such pollution.

The sharp contrast in the attitude of the two states is all the more to be remarked when the fact that there is no state below Connecticut on the Connecticut River watershed whose interests require safeguarding. The Special Master should have found that for the last five years Connecticut has had a policy aiming to prevent pollution of its streams.

## X. FISH LIFE.

*Connecticut is engaged in a program of the propagation of fish*

The use of the Connecticut Rvier for fishing has been enjoyed since earliest times. This use has been officially recognized by the State, which through its State Board of Fisheries and Game, licenses and regulates fishing, and is engaged in the operation of hatcheries for the propagation of fish. Records were introduced showing the shad catch, and fry release, for example, running back for a period of almost fifty years. (Ex. D-12.) The activities of the State Board of Fisheries and Game are set forth in detail in the testimony of its Superintendent, Mr. John W. Titcomb (Joint Summary of Evidence, pp. 151 and 152). He showed that the State operates two shad hatcheries and a perch hatchery on the Farming-

ton and Salmon Rivers which are tributaries of the Connecticut. He showed that the fry release of shad into the Connecticut River has been steadily increasing since 1923 until it amounted to almost 19,000,000 in the year 1929.

*Connecticut River now on border line for fish life to survive*

A careful examination was made of the condition of the water in the Connecticut River. These analyses showed that the amount of oxygen in the river is barely sufficient to support fish life and that there were a number of days when the river was so polluted at the state line that fish like shad must either migrate or die. (Rudolfs, Joint Summary of Evidence, p. 155.) This condition continues throughout the summer. Figures as to oxygen conditions at Hartford indicate that conditions there are just above the border line at the time of average summer dry weather flows. (Joint Summary of Evidence, p. 156.)

*Fish life affected by reduction of low flow*

Scientific knowledge has not advanced to the point where it can be stated with precision just exactly what the effect is on fish life of variations in the conditions under which the fish live. This holds even for slight changes. Mr. Titcomb explained this limitation of knowledge and basing his conclusions on his vast experience in connection with the study and propagation of fish, particularly shad, he gave as his very strong opinion that any change, as by taking out clear water of the tributaries, will adversely affect the run of fish and their natural reproduction in low water. Even as small an amount as 2% of the fresh water might change the temperature and other conditions in the stream so that they would adversely affect fish life. He admits that no human being can tell just what all these differences are, but he testified that the diversion would take out of the river the clear waters of a pure stream

which has the even temperature which fish like, every drop of which will affect the river. (Joint Summary of Evidence, p. 153.)

*Diversions will be made during low flows*

The testimony (Joint Summary of Evidence, p. 156) purports to show that due to the restrictions of the War Department, at times there would have been water released from the Swift River Reservoir increasing the flow of the Connecticut River 1½% and thus effecting an improvement in its quality. This is based upon the false assumption that on each day when there was extreme low water in the Connecticut River, there would be no diversions from the Ware and Swift Rivers but water would be released from storage on the Swift River. However, as shown in Exhibit D-36, this was incorrect, because on 40% of the days when the water in the river is low, there would be diversions from the Ware and Swift Rivers instead of releases from storage, and these facts were not on the record at the time Dr. Rudolfs testified on this subject. (Joint Summary of Evidence, p. 156.) His testimony at this point is his conditional opinion given in response to a question that was not founded on fact.

*Fish life also dependent upon spring freshets*

While it is true that oxygen in the water is essential for fish life, and that the oxygen content is less during the time of low summer flows, yet there are other conditions which affect the propagation and continuance of fish in a stream. This is particularly true of almost all anadromous fish, such as the shad which run on the high water. Fish are affected by the temperature of the water, by the time when floods occur and by the weather conditions directly following those floods. They are affected by dams; this is particularly true of shad. So far as the fish life on the Connecticut River is concerned, the

amount of the catch has, no doubt, been materially affected by the policies and activities of the State Board of Fisheries and Game, because of regulating fishing, the issuance of licenses, and artificial propagation. These factors were summed up by the Special Master as "temperature, time of flood, artificial propagation of shad, limiting and regulating shad fishermen and the fishing industry, existence of dams and other conditions." (Report of Special Master, p. 22.) Of all the conditions which affect fish life outside of the oxygen content of the water, the only one with which we are concerned here, and which is directly affected by the proposed diversions of these tributaries, is that of the reduction of freshet flows. In our Exception 57, we take issue with the finding of the Special Master "that the lowering of flood water resulting from proposed diversions is not shown to be materially injurious to the shad run" (Report of Special Master, p. 22). This finding was contrary to the evidence, which was unanimous, so far as those experienced with fishing conditions on this river were concerned, that the flood waters were an important feature in maintaining fish life. Mr. Arthur H. Frazer, whose business has been that of a fisherman on the Connecticut River, had found from his long experience that the spring floods influenced the catch of shad in the Connecticut River. This he attributed to two causes:

> First, the cleansing or flushing effect of the floods in removing the sludge banks and accumulated pollution from the river bed.
>
> Second, the forcing of fresh water out into Long Island Sound which attracts the shad into the river.
>
> (Joint Summary of Evidence, p. 151.)

Mr. Frazer's testimony was corroborated by Mr. Beckwith who testified that as a result of the 1927 flood, twice as many shad as usual were caught in the lower end of the river. (Joint Summary of Evidence, pp. 154-155.)

The phenomenon of the relation between spring freshets and the run of shad is explained by Mr. Titcomb. He called attention to the general relationship between the May floods particularly, and the catch of fish. He explained that the catch is not directly proportional to the magnitude of the May flood because numerous other factors affect fish, but he did show that over a long period of years there was a general relationship, and explained why, in any specific year due to other factors, this relationship may not appear to exist. Graphs were presented showing in general this relationship. (Ex. C-29 and C-29 a.)

Defendant offered no evidence at all on this subject. They did, however, present Mr. Robert Spurr Weston, whose qualifications as an expert (Appendix Joint Summary of Evidence, pp. xviii et seq.) include water purification, water supply, and stream pollution, but no studies of the habitat or propagation of anadromous fish, or any other species. His testimony on this subject (Joint Summary of Evidence, pp. 156, 157) is that he thought the effect of the diversion would be immaterial so far as fish life was concerned.

The Chief Engineer of the Metropolitan District Water Supply Commission, Dr. Winsor, who did not profess expert knowledge of fish life, presented a diagram (Ex. D-12), which attempted to disprove the general relation between the May floods and the catch of shad by a special arrangement of flood record from 1880 to 1929. In this, he disregarded chronological order, taking and placing beside each other, years of different decades even. The year 1927 is compared with the year 1905; the year 1898 with the year 1910. By this jumbling up of the dates so as to disregard those important factors which took place over periods of time, he neglects the gradual increase in the pollution of the stream; the artificial propagation since 1923, and the release of millions of fish fry; the number of fishermen engaged, and the permits

issued under the policy of the State Board. All of these factors, which were changing materially over this period of almost fifty years, naturally aided in producing a diagram which beclouds the relationship to which Mr. Titcomb referred.

*Diversions will be substantial during freshet time*

During these periods of high water, when the quantity of flow is so essential for flushing out the stream and pushing fresh water out into the Sound, the effect of these diversions will be most intensely evident upon the height of water in the Connecticut River, the reduction in flood heights being from 3 to 5 inches with a maximum of about 6½ inches. (Joint Summary of Evidence, p. 29 and Exhibit C-6-A.)

*Shad merely an indication as to fish life in general*

While practically all of the evidence is confined to shad, because of its particular importance on the Connecticut River, shad was taken by the witnesses merely as an indicator of the needs of fish life in general. While it is true that there are certain kinds of fish, such as carp, eel and catfish which can exist in waters with less oxygen than the amount required by other forms of fish life such as bass, pickerel and trout, yet because of the preponderance of shad in the Connecticut River, it is reasonable to use this fish as an indicator or index of the requirements of fish in this stream. (Joint Summary of Evidence, p. 155.)

*Shad catch affected by diversions and other fish life necessarily affected*

The record shows that the conditions of the river are now close to the border line (Joint Summary of Evidence, p. 156), and that fish life has a higher oxygen requirement than the amount which is sufficient to prevent nuisances. It

must necessarily follow that any diversion from the stream during low flows tending to increase pollution concentration or affect the temperature of the water, will be deleterious to fish life. Further, decreasing the intensity of the flood flows, thus reducing the cleansing capacity of the river, will disturb and reduce fish life to the detriment of the citizens of Connecticut who enjoy fishing and who earn a livelihood from this industry.

The State in its trusteeship over streams must protect them, not alone for navigation but also for fishing, and this duty has been imposed upon government since the days of *Magna Charta*. The trusteeship of the State in this connection is discussed elsewhere in this brief.

## XI. MASSACHUSETTS DEFENSE

The Commonwealth of Massachusetts in its Answer filed in response to the Bill of Complaint of the State of Connecticut not only denies and puts the Complainant upon proof of certain facts alleged in the Bill of Complaint but also goes further and alleges certain affirmative allegations, first, in connection with the allegations of the Complainant substantiating its claim for relief; and second, matters which the Commonwealth claims to be reasons why the bill of the Complainant State, if proven, should not prevail.

As to the matters contained in the Complainant's bill, it is alleged by the Commonwealth of Massachusetts—

1. That the proposed diversions of water from the Ware and Swift Rivers, so far as they affect the flow of the Connecticut River, are not measurable nor determinable.

2. That no possible injury or damage will be caused to either the Complainant State or to any of its citizens because of these diversions.

3. That the diversions will be of great benefit to Connecticut and its citizens because they will reduce damage from floods.

4. That it is the intention of Massachusetts to increase the usual flow of the Connecticut River through the manner of the diversion of these streams.

5. That the waters of the Connecticut River at the present time are sufficient at all times of the year to take care of all of the pollution which Massachusetts now permits to be introduced into the stream and will not be increased or affected by the diversion of these waters.

6. That notice was given to the State of Connecticut of the intention of Massachusetts to authorize these diversions. That Connecticut was represented and heard at length concerning these diversions before the Acts were passed.

These are the allegations of fact which have been affirmatively alleged by the Commonwealth of Massachusetts in answer to the bill of Connecticut and the burden of proof is upon Masachusetts to sustain these allegations.

How well this burden has been sustained may be discovered in a short résumé of the evidence produced at the trial.

> *First*, so far as the diversions not being measurable or ascertainable, it appeared from the evidence of Dr. Winsor, Chief Engineer of the Metropolitan District Water Supply Commission that based upon weekly averages the diversions would take from the waters of the Connecticut River 2.13 per cent of the average flow under the Massachusetts legislation and 2 per cent of the average flow of the river under the restrictions of the War Department, the average flow being 17,000 cubic feet per second. These facts were admitted by the Complainant.

*Second*, no evidence was introduced by the Commonwealth of Massachusetts to show that no damage would be caused by these diversions. As to power, their principal witness, Mr. Weston E. Fuller, admitted that the diversions under the Massachusetts legislation would reduce the waterpower available at Windsor Locks one per cent of its productive capacity and three-quarters of one per cent under the restrictions imposed by the War Department. As to agriculture, the only witness appearing for Massachusetts, Mr. Christensen, admitted the benefit of the freshet flows of the river and that his property would be damaged by loss of these flows. Counsel for the Commonwealth entered into a stipulation that 9,500 acres of land devoted to the growing of hay would be affected by a diversion of these streams. As to navigation, no witnesses appeared for the Commonwealth of Massachusetts to refute the testimony of those who actually navigated the river.

*Third*, the nearest approach to an attempt to prove damage from floods was the cross-examination of Mayor Batterson of Hartford who conceded that if the city desired to use lands for other purposes rather than the purposes for which nature expected them to be used, that the city is ready and willing to protect these lands against the floods but not to interfere with the use of the flood waters by others to whom they are beneficial. No attempt was made to prove any benefits to the State of Connecticut or its citizens because of these diversions.

*Fourth*, as to any increase in the flow of the stream, it appeared that under the Massachusetts legislation it had picked the lowest flow, which occurs only on the average of one day a year, as the flow which it would permit to be released from the stored waters of the Swift River. The only increase of flow is that provided in the War Department findings in possible aid of navigation and which the War Department insists must be complied with by Massachusetts in order to take any water from the river.

*Fifth*, as to pollution, the Massachusetts witnesses claim that, based upon monthly averages and disregard-

ing actual daily conditions, the stream at the Connecticut-Massachusetts state line was able to care for the pollution entering the stream in Massachusetts, but no effort was made to show that the sanitary conditions of the stream would be improved by the Commonwealth of Massachusetts. On the other hand it was shown that by legislation the Connecticut River is exempted from control by the Massachusetts State Department of Health.

*Sixth*, as to any notice to Connecticut for any hearing before the passage of the Acts in question the record is silent, no evidence having been produced by Massachusetts.

The Commonwealth of Massachusetts also affirmatively alleged certain facts which it claimed to be sufficient to warrant this Court in refusing to grant the relief sought by the Complainant. This claim is based *first* upon the fact that there are no pure and unpolluted sources of water supply in the eastern part of Massachusetts from which an adequate supply can be obtained for an addition to the domestic supply of the Metropolitan District of Boston and all towns which may decide to obtain a supply of water from it. *Second*, that because of this lack of available supply that a great impressive emergency or necessity exists because if the waters of the Ware and Swift Rivers cannot be obtained there will be great distress and hardship and even sickness and disaster in the City of Boston and surrounding communities because there will be no supply of water for them to use.

It appears in the report of the Special Master, page 29, as follows—

> "In this view, I have regarded as important the allegation of Connecticut in an amendment to the bill that the Boston District as well as the neighboring population can well be supplied with good water from the eastern part of the state."

The Special Master also finds on page 51 of his report as follows—

> "Having found on the first branch of the case that Connecticut will not be substantially and seriously injured by the Ware-Swift diversion and the people of Massachusetts having made their decision in favor of the Ware and Swift, conceding that it is open to Connecticut to ask this Court to overrule the Massachusetts determination and relegate Boston and the Metropolitan District to the water supplies in the eastern part of the state, certainly the burden is on Connecticut to make a peculiarly clear and conclusive showing. I content myself with finding that no such showing has been made. Giving the proof of Connecticut the utmost weight it no more than raises a doubt."

The Special Master further finds on pages 49 and 50 of his report, as follows—

> "Connecticut in this respect is calling on the Supreme Court of the United States to determine how much water supply is now available and will continue available for a long period of time for the inhabitants of the whole northeastern part of Massachusetts; to determine how much of this water is fit for human use and will remain so for a long period of years; to say how much of it ought to be fitted for use, involving cost and expense of fitting reasonable to be imposed on the public; and to divide the supplies among the towns and cities and other communities of the region."

The Complainant has excepted (Exceptions Nos. 61 to 65, both inclusive) to this ruling by the Special Master. It is plain from an examination of both the original Answer and the Amended Answer filed by the Commonwealth of Massachusetts that its principal claim to defeat the Bill of the Complainant and to prevent the remedy applied for was based upon these two affirmative allegations made by it. These affirmative allegations are set forth at length in paragraphs 17 of Reprint

of Defendant's Answer, pages 19, 20, 21, 22 and 23 and in the first and third allegations as set forth on pages 30 and 32 of the Reprint of the Answer. No one reading these excerpts from the Answer can but feel that the strength of the Massachusetts case rested upon the truth of the matters therein alleged. Having raised these issues, it is the claim of the Complainant that the burden is squarely upon the Commonwealth of Massachusetts to sustain their burden of proof and to prove at least by a preponderance of evidence that there exists in eastern Massachusetts no sources of supply which can furnish the people of that territory with a pure and unpolluted water for drinking purposes and that if it is impossible to acquire the water of the Ware and Swift Rivers that serious injury and damage will follow to the people of Boston because it will be impossible to furnish them with a safe and adequate supply of water for domestic purposes. It is with these considerations in mind that we proceed to discuss the available supplies in the eastern part of Massachusetts, their availability for use and that they can be made to supply the people of Boston with a pure and wholesome supply of drinking water, if the Ware and Swift Rivers cannot be obtained by the Commonwealth of Massachusetts.

## XII. AVAILABLE WATER SUPPLIES IN EASTERN MASSACHUSETTS

In determining whether a given source of water is available for use as a domestic water supply, Professor C-E. A. Winslow, an eminent authority on public health matters, called as an expert by the complainants, laid down three general rules which would influence his decision: first, he would be interested in the final quality of the water which could be produced; second, the cost; and third, the extent to which the taking of a given supply would interfere with other communities both within and without the State. (Joint Summary of Evidence, p. 206.)

The above gives a very concise statement of what fundamentals should be considered in determining the availability of a given water supply.

*Massachusetts legislative reports*

There have been three important investigations of the water supply problems of Boston and the Metropolitan District. These investigations have generally been of a most comprehensive nature, and have included not only Boston but generally most of the communities in the Commonwealth. These three reports have, however, dealt primarily with the resources which are available for Boston and the Metropolitan District; have discussed their availability, the cost thereof and problems in connection with their operation; and finally made recommendations as to which supply was considered most desirable.

All three of these reports have been submitted in evidence in this case and have been identified as follows:

Massachusetts House Document No. 500, 1895.
Report of Massachusetts State Board of Health, Complainant's Exhibit C-3.

Massachusetts House Document No. 1550, 1922.
Report of the Joint Board on Water Supply, Complainant's Exhibit C-1.

Massachusetts House Document No. 900, 1925.
Report of the Metropolitan Water Supply Investigating Commission, Complainant's Exhibit C-2.

*The 1895 report*

In 1895, the report of the Massachusetts State Board of Health upon a metropolitan water supply (Complainant's Exhibit C-3) in tabulating the various water resources which were available for its consideration, included the Merrimac River, Lake Winnipesaukee in New Hampshire, the Charles

River, the Shawsheen River, the Ipswich River, the Assawompsett and other ponds, Sebago Lake in Maine, and the Nashua River. The report recommended the immediate development of a water supply from the Nashua River by the construction of a large impounding dam, forming what is now known as the Wachusett Reservoir.

The report further showed that this supply could be supplemented by the use of the waters of the Assabet and the Squannacook Rivers, both of which drain into the Merrimac; and also tributaries of the Connecticut River, the Ware, the Swift, the Deerfield and the Westfield.

The report discussed these various supplies, dwelling on the quality of the water which could be obtained, the cost, and in some cases touching on the interstate features.

At that time, of course, the art of water purification was in its infancy and but few applications of the scientific knowledge which we now have were then available—thirty-five years ago. Nevertheless, the state of the art was such that there was no doubt in the minds of those who wrote the report and who had made the investigation, that the Merrimac River was available, for we find the following in the report:

> "The quantity of water that could be obtained in this way (i.e. from the Merrimac River above Lowell) and for this purpose is unlimited; and, if there were no way of obtaining a better supply of water and one which was above suspicion, *it would be practicable* to introduce water from that source at a *cost somewhat less than from any other source considered.*" (Exhibit C-3, p. xv.) (Italics ours.)

Due to the state of the art at that time, no doubt more emphasis was placed on the original quality of the water than on the final quality; but what is most important in the report of 1895 was that it attempted to lay down a policy which, as

we shall see, later determined future developments of the District in spite of changes in the art. This is set out on the next page of the report, where the Board states:

> "The very great merit of the plan now submitted is to be found in the fact that this extension of the chain of the metropolitan water supplies to the valley of the Nashua *will settle forever the future water policy of the district*, for a comparatively inexpensive conduit can be constructed through to the valley of the Ware River, and beyond the Ware River lies the valley of the Swift; and in a future so far distant that we do not venture to give a date to it, are portions of the Westfield and Deerfield Rivers capable, when united, of furnishing a supply of the best water for a municipality larger than any now found in the world." (Exhibit C-3, p. xvi-xvii.)

*The 1922 report*

The 1922 report, Exhibit C-1, was prepared under the direction of a Joint Board composed of members of the State Department of Public Health and the Metropolitan District Commission, which investigated the water supply needs and resources of the Commonwealth. This report contains the investigation of sources of water supply, reconsidering the sources investigated in 1895, and including in the investigation the more important sources covered in that report, such as the Charles River, the Shawsheen River, the Ipswich River, the Assawompsett and other ponds in Lakeville, Sebago Lake in Maine, Lake Winnipesaukee in New Hampshire, and the Merrimac River above Lowell. (Exhibit C-1, pp. 153, 154.) The report further includes investigations of the Assabet River and of the tributaries of the Connecticut, including the Ware, the Swift, the Millers, the Quaboag, the Deerfield and the Westfield.

In this report we find, in connection with the investigation of these various supplies, that the following general principles

were adopted: "(1) choice of unpolluted source as far as practicable; (2) utilization of the natural agencies of purification to the greatest practicable extent; (3) prevention of pollution by land purchase and by the enforcement of sanitary rules and regulations; (4) filtration of water, (a) when the population on the watershed is relatively large, (b) when it is desired to permit boating and fishing in the sources of supply, and (c) when the water is unsatisfactory in its appearance, taste or odor; (5) the choice of filtration and other purification methods to be governed by the nature of the supply, by cost considerations, and by the desire to produce a water hygienically safe, attractive in its appearance, tasteless and odorless, and without corrosive properties; (6) the combination of these various natural and artificial protective methods according to local conditions and economical considerations; (7) the storage of filtered water in covered basins as far as this is practicable." (Exhibit C-1, pp. 10, 11.)

This report recommended, after considering other supplies, the development of the Ware and Swift Rivers, tributaries of the Connecticut. However, the report recognized the need of the conservation of the present resources by recommending the filtering of the South Sudbury and Cochituate systems, and the ultimate filtration of all of the Metropolitan Water Supply. Further it recommended that the Ipswich River should be developed by the construction of one or more large storage reservoirs for the joint use of the cities and towns in Essex County. These recommendations other than the Ware and Swift have never been authorized.

Some specific references to this document (Exhibit C-1) may prove of interest.

First, as to the Assabet—

> "Investigations made in connection with the report of 1895 upon a metropolitan water supply indicated

> that the waters of several streams in the upper part of the Assabet River watershed, through which the Wachusett Aqueduct passes in its course to the Sudbury Reservoir, could be utilized for supplementing the metropolitan water supply by diverting them into the aqueduct through some six separate connections. In the report of the chief engineer it is stated that a total drainage area of about 34.4 square miles could in this way be diverted into the aqueduct and thence into the Sudbury Reservoir, and the available yield of the metropolitan sources thus increased about 28,000,000 gallons per day at a comparatively small cost." (Exhibit C-1, p. 166.)

After stating that this scheme had been carefully re-considered, a table was prepared showing the streams which might be diverted for use of and the yield obtained by the Metropolitan District. The report goes on to state the following (page 167):

> "There has been no material change in the character of the water of most of these tributaries since 1895. Their watersheds are for the most part sparsely populated, and water of good quality for water supply purposes can be obtained from them at the present time."

Following this statement the unfavorable aspects of the scheme are commented upon and the report discusses it in comparison with the proposed taking of water from the Ipswich River. We quote from page 169 of this report in reference to the Ipswich River:

> "The conditions in the valley of the Assabet River below the proposed points of taking are quite different from those in the valley of the Ipswich River below the authorized points of taking on that stream. While the watershed of the Assabet River contains large towns and important industries, the watershed of the Ipswich River, on the other hand, contains few manufacturing establishments, of any kind, and, excepting at the mouth of the stream where it enters the sea, no

considerable town. Moreover, the quantity of sewage or industrial waste which finds its way into this river above Ipswich is comparatively insignificant. While sewage and manufacturing waste can be so treated that the resulting effluents may not create offence when discharged into a stream, they will still contain more or less matter which, unless well diluted, may so affect the character of the water that, though perhaps inoffensive, it may be objectionable for certain uses below."

The above quotations show that preference in the development of these waters was being given to the use for dilution of sewage and trade waste to the higher use for domestic water supply purposes by the Metropolitan District.

This report, as stated above, reconsidered the availability of the Merrimac River with filtration. We have called attention to the policy of Massachusetts in regard to the selection of water supply. We have previously noted that this Board expected that the entire water supply of Boston would eventually have to be filtered. In regard to the new supply from the Swift River the report states:

"In planning the Swift River Reservoir the Chief Engineer has chosen to rely upon filtration rather than soil removal or chemical treatment. It may not be necessary to construct filters for this water in the near future, but we believe that the entire *Metropolitan Supply must ultimately be filtered.*" (Exhibit C-1, p. 10.) (Italics ours.)

Furthermore, in the report we find this statement:

"By filtration, supplemented by aeration, and where necessary by chemical treatment, the surface water supplies of the State can be made not only safe but attractive in all respects and at all times." (Exhibit C-1, p. 9.)

Referring specifically to the use of the Merrimac River as an available water supply, the report states:

> "Water taken from the Merrimac River above Lawrence is used for the water supply of that city at the present time after filtration and sterilization, and there is no doubt that the water of this river could be used for the water supply of the Metropolitan District, if necessary, provided it were properly filtered." (Exhibit C-1, p. 160.)

Not only did this Commission and its Chief Engineer and Consulting Engineers consider that the quality of the Merrimac River water was such that it could be properly filtered, but there was no doubt in their minds, as was true at the time of the 1895 investigation, that there was an unlimited quantity of water available, for the report states:

> "Investigations were also made in 1895 with reference to the use of the water of the Merrimac River above Lowell for the water supply of the then proposed Metropolitan Water District, and the results are presented in considerable detail in the report of that year. The Merrimac River above Lowell drains a net area of about 3,979 square miles and above Lawrence about 4,452 square miles, *and if diverted at either place would furnish an almost inexhaustible water supply for the Metropolitan Water District.*" (Exhibit C-1, p. 159.) (Italics ours.)

It will be noticed, by reference to Exhibit C-1, that this report was not a unanimous report. In this document is to be found the minority report of Mr. James A. Bailey, a member of the Metropolitan District Commission and of the Joint Board, pertaining to the waters of the Nashua River at the Wachusett Reservoir.

The Wachusett supply was put in service in 1896 and this supply is in addition to the waters which were being used prior

to that date. We quote the following from Mr. Bailey's report:

> "Since the Wachusett Reservoir first filled in 1908 there has been an abundant supply of pure water for all the inhabitants of the district. The reservoir has filled and overflowed in nine of the fourteen years. *During this period in several years the amount of water wasted, because all the reservoirs were overflowing, has nearly equalled the amount delivered into the aqueducts for use; and in two years the amount wasted has exceeded the amount used.* The largest reservoir alone holds a supply approximately sufficient to care for the needs of the entire district for one and one half years, even if no rain fell during this period, eliminating evaporation from this calculation. The total storage capacity is so great that the district easily passed through four successive dry years, 1908-11, the period of lowest water yield since the Sudbury records were started in 1875, and in the last of the four years the Wachusett Reservoir was drawn down only 17 feet, and promptly overflowed the following spring." (Exhibit C-1, p. 33.) (Italics ours.)

The waste of water by discharge over the spillways of the reservoirs, to which Mr. Bailey refers, is the result of the policy of Massachusetts to attempt to preserve the purity of its water supply resources by "natural agencies." This involves maintaining in the reservoirs large quantities of water at all times, thus reducing the capacity of the reservoir for storage purposes.

The policy of the Metropolitan District has been gradually to increase the amount of water to be reserved in its reservoirs for storage purification purposes, and thus they have constantly reduced the available draw-down capacity of the reservoirs, and consequently, diminished the yield of the sources.

When the Wachusett Reservoir was recommended, it was pointed out (Ex. C-3, p. 69) that by the construction of this

reservoir, the safe supply of all sources of the Metropolitan Water Supply would be brought to 173 million gallons per day. This estimate was based on the reservation in the reservoirs for purposes of storage purification of 10 billion gallons of water. Constant increases of the amounts of water believed necessary to be retained in the reservoirs have resulted in decreasing the safe yield to 147 million gallons per day. By the substitution of modern treatment methods more water can be made available and the safe yield of the sources of supply again increased to 173 million gallons per day.

This is what Mr. Bailey's statement and his accompanying graph bring out very forcefully. His graph shows that the average use of water by the Metropolitan District for the period of 1908 to 1920 inclusive was 115 million gallons per day, and the amount of water wasted was 64 million gallons per day, or a total of 179 million gallons per day, which was available for use during the years 1908 to 1920.

The report of the Metropolitan Water Supply Investigating Commission (House Document No. 900, Massachusetts 1925, Ex. C-2) recognized the possibility of the use of larger amounts of this water in the following statement on page 43:

> "As pointed out in our engineer's report, in the absence of filtration, purification of the water must be secured by long storage in reservoirs. If it becomes necessary to draw from storage excessively, as is now being done at the Wachusett Reservoir, the diminished volume may not afford an opportunity for holding the incoming raw water for a sufficient period in which to assure the complete sterilization and bleaching which is required to produce a satisfactory quality for domestic consumption. If, on the contrary, the water is subsequently filtered after passing through the reservoir, the initial storage purification need not be depended upon, and such a reservoir may be drawn to the very bottom if necessary with no harmful effect.

> The depth to which a given reservoir may be safely drawn is an important factor in determining the dependable yield of that particular source, so that filtration serves to increase materially the available capacity of the supply. In other words, the filtration of the present Wachusett supply would increase the amount of water obtainable from it."

The Engineer of this Metropolitan Water Supply Investigating Commission pointed out on page 71 (Ex. C-2):

> "If we assume, what is a fact under present operating conditions, that the reservoirs must not be drawn to their bottoms, but that certain substantial quantities must be held in them as an aid in maintaining quality, then the estimated capacity of the system will be reduced. It is hard to say how much should be reserved for quality. Any allowance that would be at all satisfactory would mean a large cut in capacity."

And again on pages 83-84, Mr. Hazen said (Ex. C-2):

> "To get the full delivering capacity of the system, the full capacity of Wachusett Reservoir must be available; that is to say, it must be drawn to the bottom when needed. Maintaining quality by storage as at present and getting such maximum delivery are incompatible. There must be a sacrifice of either quantity or quality, or a change in method. When it is necessary to get the full quantity, it should not be done at the sacrifice of quality. The only way in which both can be maintained is by filtering the water."

Dr. Winsor testified (J. S. E., pp. 19-20) that the substantial additions to the Metropolitan Water Supply which are available in comparatively near-by sources, as pointed out by the Metropolitan Water Supply Investigating Commission, had not been brought into the Metropolitan Supply.

The Ware River Act (Chapter 375, Acts of 1926, Reprint of Answer, p. 39) directed the Metropolitan Water Supply Commission to:

> "Consider the recommendations of the metropolitan district commission relative to making available by filtration or chlorination, or both, the waters of the Sudbury and Cochituate watersheds."

Mr. Allen Hazen had pointed out in Exhibit C-2, that 26 million gallons per day were available in these sources of supply, that they were not now used by the district and that they could be made usable by filtration.

Mr. Jacobs, witness for Complainant, estimated that the filtration of the South Sudbury would reclaim 17 million gallons per day of water from present Metropolitan Water Supply sources not now being used.

Dr. Winsor testified (Record, pp. 86 and 87):

> "The Metropolitan District Water Supply Commission was also authorized at that time, on account of the possible acute need of the district, to make practicable certain sources in the southern Sudbury area which had not been used for many years, due to the fact that these sources discharge into the Sudbury River, and flow down through a section of drainage area which had become quite heavily populated, and they were not considered suitable for use . . . . . the Commission decided to pipe this area in the southern part of the Sudbury, . . . . . into the suitable supplies of that district, and to cut out this intermediate area . . . . . from use."

The filtration of the South Sudbury for reclaiming 17 million gallons per day of water not now being used was an integral part of the 15-Watershed Plan described by Mr. Jacobs for increasing the water supply of the Metropolitan

District from sources in the eastern part of the state and discussed in detail hereafter. Another feature of this plan was the making use of the total storage capacity of the Wachusett Reservoir and the consequent reclamation of further quantities of water which Mr. Bailey's report, Exhibit C-1, pointed out were being wasted under existing methods of operation of the Metropolitan Water Supply.

*The 1925 Report*

This report of 1925 took cognizance evidently of the differences of opinion which existed regarding the selection and method of the development of these available water supplies. The Commission which made this report employed the late Mr. Allen Hazen of New York, a celebrated authority upon the subject of water supply, as its Consulting Engineer, and he called into conference the late Mr. Leonard Metcalf, then senior member of the firm of Metcalf and Eddy of Boston, equally well-known throughout the country as an expert on water supply; and the Commission, advised by these very eminent water supply engineers, reported as follows:

> "It cannot be honestly contended that the taking of the water of the Ware and Swift rivers as proposed in the Joint Committee's report is the only solution of the problem available at this time, even though in some respects it may be the best one." (Exhibit C-2, pp. 34, 35.)

This report agreed with the report of the Joint Board (Exhibit C-1) on the question of filtration of the Metropolitan District supply, but recommended the development of the Assabet in connection with the Wachusett-Sudbury supply.

This report further agreed with the report of the Joint Board (Exhibit C-1) that the Ipswich River should be developed, but called attention to the fact that the supply available from the Ipswich was far in excess of the needs of Essex

County communities, and therefore should be developed for the Metropolitan District as well as for these other communities.

In regard to the diversion from the Connecticut River watershed, the report recommended the use of the upper waters of the Ware River with the provision that a compensating reservoir be constructed on the Ware for the purpose of maintaining the flow of the Connecticut River.

*Complainant's investigations*

Complainant offered the testimony of a number of engineers who had investigated the various supplies in eastern Massachusetts, which had been referred to in these reports. They made surveys, investigations, and analyses of the water; and after their investigation called attention to the fact that they agreed with the former reports that there was an unlimited supply of water available in the Merrimac River, and stated that there were other supplies in eastern Massachusetts which could be developed to make available 179,000,000 gallons a day for northeastern Massachusetts. (Joint Summary of Evidence, p. 160.)

These investigations were reduced to plans and submitted to the Special Master, showing the detailed method of developing the Merrimac River water, and also details for the other supplies which are referred to in the record as the "Fifteen Watershed Plan."

The methods suggested by the Complainant's engineers differed but slightly from the recommendations of the reports, but in general showed improvements and suggestions either providing a better water or showing more water available than was originally contemplated.

The principal recommendation referred to the Merrimac River; and they proposed the development of a large storage reservoir for the purpose of "utilizing the natural agencies

of purification," as had been suggested as the second principle to be considered, in the policy of Massachusetts. (Exhibit C-1, p. 10.)

In regard to the Fifteen Watershed Plan, the Ipswich development recommended by the Joint Board in 1922, and the Water Supply Investigating Commission in 1925, was supplemented by diverting into this watershed the waters of the Shawsheen River. Otherwise the suggestions of Complainant's engineers are the same as those of the 1925 report; namely, the filtration of the Sudbury supply, the development of the lower Sudbury supply in connection with the Hobbs Brooks Reservoir, and the use of the Assabet by carrying the waters of its tributaries into the already constructed Wachusett aqueduct.

*Two particular plans of development for eastern Massachusetts water supply resources were suggested*

From the examination of this series of reports (Exhibit C-1, C-2 and C-3) and the investigations of the Engineers who testified for the Complainant, it will be noted that there are two particular projects which could have been developed by Massachusetts instead of the Ware and Swift Rivers. These projects we will refer to as 1. The Merrimac River development, and 2. The Fifteen Watershed Plan.

*Merrimac River Development*

Much testimony was taken in regard to the use of the Merrimac River. Probably this can best be summarized by a quotation from the Report of the Special Master as follows:

> "It is agreed by all the witnesses that Merrimac water needs modern treatment to qualify it for drinking. The process involved was described by Mr. Jacobs and all the experts accepted his statement. The treatment of such waters consists of several processes.

> First, long storage (30 to 90 days in a large reservoir), next aeration, then chemical treatment for coagulation, then filtration and chlorination. Water is aerated by throwing it into the air or running it over falls or rapids. Chemical treatment for coagulation consists in adding lime and alum which form a hydrate that attracts both bacteria and particles. It also is useful to improve color. Filtration involves a separate reservoir or set of reservoirs in which water is passed through gravel and sand. Finally the water is chlorinated and stored for delivery."
>
> "Every expert agreed that by treatment on the general lines indicated the Merrimac water could be made hygienic."
>
> (Report of the Special Master, p. 46.)

And here we emphasize the point that the suggestion of the eminent engineers who testified, to introduce the natural process of purification, namely, storage, makes this plan an improvement over any other plan which had previously been considered, in spite of the fact that it had been frankly admitted in every report where the Merrimac was under consideration, that there were no insurmountable difficulties in regard to rendering this water hygienic and safe for use.

*The yield of the Merrimac River is unlimited*

In the reports and investigations no intimation is ever found that there was not an unlimited quantity of water available for the Metropolitan District in the Merrimac River. That quite the opposite was true will be noted in the previous quotations, p. 175. However, after knowing for over thirty-five years that there was an unlimited supply available, when the use was suggested by the witnesses called by the State of Connecticut in this case, immediately witnesses were produced who found other uses for the water and claimed for the purposes of this case that this water was not available. However, they could not have been serious in this intention, for Massachusetts produced a

plan which they claimed improved on the method of obtaining a supply from the Merrimac, referred to as the Merrimac-Ipswich project, testified to by Mr. Kennison (Joint Summary of Evidence, p. 244) which showed a method for the development of 191,000,000 gallons per day (Joint Summary of Evidence, p. 246).

*Lawrence, Massachusetts, obtains its water supply from the Merrimac River*

Lawrence water supply is obtained by pumping water directly out of the Merrimac River into a filtration plant without previous storage, and relying entirely upon purification by filters, some of which were among the earliest in the United States, and then subsequent sterilization. Lawrence, like the Metropolitan District, has considered from time to time methods of increasing and improving its waterworks system. These investigations have resulted in reports which have guided the city in connection with its own water supply problem. Two of these reports are particularly referred to in this case. The first report was that of 1917, by Morris Knowles, a Consulting Engineer of Pittsburgh, excerpts of which are set forth in the record, pp. 1,511 to 1,527 inclusive, Defendant's Exhibits D-18, D-19 and Complainant's Exhibit C-40 and in the Joint Summary of Evidence, p. 301 to 311. Subsequently a report was made, identified as House Document, No. 1450, of March, 1923, entitled "Special Report of the Department of Public Health Relative to a Water Supply for the City of Lawrence and the Town of Methuen." (Defendant's Exhibit D-16.)

*The Knowles Report of 1917*

Reference to the Knowles report of 1917 is made by the Special Master who states in his report as follows:

> "Morris Knowles of Pittsburgh, senior member of the firm now employed by Connecticut and proposing Merrimack water, was employed by the city of Lawrence

in 1917 to recommend supplies of water and in this letter to the city said this:

'As a source of water supply the Merrimack . . . is grossly polluted now, and will probably continue to become more polluted as time passes. Under present conditions its purification is incomplete and is attended by certain lapses, which at numerous times in the past have reached a disquieting if not a dangerous stage. Although this supply can be artificially treated and purified so as to be perfectly safe to drink, the weight of disfavor against the stream as a source of supply has become so great and so real as to actually *obliterate any economy in its use.*

We therefore recommend that the Merrimack River be abandoned as a source of water supply for Lawrence.' " (Italics ours.) (Report of the Special Master, p. 47.)

Mr. Knowles in his report further stresses the expenditure for bottled water, to which the Special Master referred as follows:

"For example it appears in the evidence that the city of Lawrence, Massachusetts, is the only town using Merrimac water for drinking. The result is a most extraordinary sale of bottled water in Lawrence. It is delivered generally like milk. 1916 statistics showed that the amount of money paid in Lawrence for bottled water was 55 per cent of the total amount paid for public water for all purposes. To force people to bottled water is not conducive to the public health. Such facts as those about Lawrence also show a reason why public opinion ought to be regarded in selecting water supplies." (Report of Special Master, p. 50.)

The Complainant excepts to this finding first because it is based upon a fourteen-year-old survey which has not been since verified and second, because the analyses of the Lawrence filtered water shows better results than the water now in use by the Metropolitan District. (Exception 58.)

The significant fact in this statement is that it was necessary to rely on data as old as 1916. Surely, did these conditions exist to-day, more recent evidence could have been produced.

Mr. Knowles made his report in 1917 and recommended the Bartlett's Brook as a source of water supply, and in this connection Mr. Knowles said,

> "It may be worth while to point out that one of the advantages of this project,—albeit a doubtful one from the standpoint of quality,—is that in case of emergency, Merrimac River water could be pumped into the reservoir, to be stored for a long time, to supplement the supply. . . . . ."
>
> (Joint Summary of Evidence, p. 311.)

The method employed at the time of Mr. Knowles' report for obtaining a water supply for the city of Lawrence is not at all comparable to the project suggested by the Connecticut witnesses for securing a supply of water for the Metropolitan District from the Merrimac River. The project suggested for the Metropolitan District involved large storage of water never previously considered by anyone. A most careful reading of the Engineers' reports, Exhibits C-1, C-2 and C-3, will show that there is not any suggeston of storage in connection with the filtration and purification of the Merrimac River water. Expert witnesses without exception stated that storage was an important feature, and the witnesses familiar with the Metropolitan District problem admitted that they had not heretofore considered storage in connection with the Merrimac River supply. A plan for adequate storage was not economically available for Lawrence, but in the report of Mr. Knowles rendered to the city of Lawrence in 1917, reference is made to a development on Fish Brook; and the Court will find in the Joint Summary of Evidence at page 310 the following excerpt from the Knowles report:

> ". . . . Description of Proposed Works:— This, essentially, is a purification project in which the preliminary treatment is accomplished by storage and dilution. Since this supply is insufficient for Lawrence even at the present time, the deficiency is to be made up by pumping water from the Merrimac River to the reservoir, where a dry weather storage of about 160 days would be obtained. We could confidently expect that this would effect a considerable improvement in the character of the raw Merrimac river water, both because of dilution and because of the effect of storage. Color would be reduced to about 40 per cent of that in the raw river water, while practically all turbidity and most of the suspended matter should be removed. We may expect a bacterial reduction of not less than 85 per cent, if figures are based upon bacterial counts of the raw river water."

Furthermore, it must be kept in mind that all of the discussion of the Merrimac River referred to in the Knowles report pertain to the conditions of the river at Lawrence. This is not the point suggested for taking the water for the Metropolitan District; the point suggested for the Metropolitan District is at Tyng's Island above Lowell which is the principal contributor of sewage as stated,

> "The various pollutions and *nuisances* shown in these photographs are comparatively unimportant in proportion to the vast quantity of sewage discharged into the river at Lowell, only a short distance above."
>
> (Joint Summary of Evidence, p. 305.)

The distinction between conditions existing now and in 1917 at Lawrence is summarized by Mr. Jacobs, a member of Mr. Knowles' staff who was associated with him at the time the report was made, as follows:

> ". . . . that excerpts of the report to the Lawrence Water Supply Commission of 1917 by Morris Knowles, Incorporated show that one of the

> advantages of the site finally recommended for Lawrence water supply was that Merrimac River water could be pumped into it and stored in the recommended reservoir on Bartlett Brook; that some of the other excerpts show the prejudices and the inefficiencies which existed in Lawrence, all of which he feels have been corrected by the project as outlined for a much larger district than the small city of Lawrence; that in spite of the fact that this report was made 13 years ago and other reports have been made since, Lawrence still takes its water out of the Merrimac River and the filtration plant has been improved; that he does not think that Lawrence objects to the use of the Merrimac River water;"
>
> (Joint Summary of Evidence, p. 183.)

*Department of Public Health report*

In defendant's Exhibit D-16 is set forth a letter to the Commissioner of Public Health by J. Waldo Smith, Consulting Engineer, from which we quote as follows:

> "Evidently the most practical and most economical course for Lawrence and Methuen would be to revamp and thoroughly modernize their present filter plant so as to insure a delivery of an ample quantity at all times which would be safe, if not entirely satisfactory, or else to purchase water from adjacent towns." (Defendant's Exhibit D-16, p. 68.)

*The Lawrence filters*

As a result of these reports, both of which show methods of obtaining ample and abundant supplies in eastern Massachusetts other than the Merrimac River, it is interesting to note that the next step which the city of Lawrence took was to retain Mr. Morris Knowles of Pittsburgh to design a filtration plant for continuing to take water out of the Merrimac River. This new plant was built in 1925 and stands as a positive refutation of all of the insinuations in regard to prejudice and

practicability of the use of the Merrimac River for a water supply at Lawrence, and further we emphasize that Lawrence obtains its supply, not as was suggested for the Metropolitan District, above the city of Lowell, but below it, and it does not have even to-day the natural purification obtainable by a large reservoir as has been suggested by Complainant's engineers at the Foster-Martin Pond, or by defendant's engineers on the Ipswich River.

*The quality of Lawrence water compares favorably with that of the Metropolitan District*

Referring to the quality of water now delivered to the people in Lawrence, Mass., from the Merrimac River, Professor Winslow testified that the water is considered suitable after treatment by filtration and chlorination. He further testified that the typhoid fever rate in Lawrence has been one of the very low rates in this country, showing the absolute protection to public health which has been afforded by the Lawrence waterworks since the installation of its modern filtration plant. But what is still even more outstanding in regard to the quality of the water now being furnished to the city of Lawrence is the fact that Lawrence, with less complete and effective purification than proposed for the Metropolitan District, has obtained a water which, in at least one or two years, has been pronounced by the Massachusetts State Department of Health as better than that of the Metropolitan District. (Joint Summary of Evidence, pp. 203, 204.)

*Points advanced by Massachusetts as reasons for not choosing the Merrimac River*

Massachusetts, through various witnesses attempted to show, in defense of its action in choosing the Ware and Swift in preference to the Merrimac, that there were a number of

obstacles which would interfere with the use of this stream as a supply of water for the Metropolitan District. These objections included (1) Pollution of the river; (2) The damages to power interests in Lowell and Lawrence; (3) Possible damages to navigation; (4) The possibility of a breakdown due to the human element in the purification process.

*Pollution of the river*—the Merrimac River drains a large area in the States of New Hampshire and Massachusetts. On its watershed are located many towns and factories; and in this respect it is not much different from any other stream of its size and character in the United States; in fact the records will show that it is far less polluted than most rivers, and that its condition, as evidenced by the analyses, has been steadily improving. The Special Master found:

> "The Merrimack is a polluted river. It drains a large watershed mainly in New Hampshire but partly consisting of the Nashua watershed, the major part of which is in Massachusetts. . . . . It is a district of large population and enormous factory development, the larger part of which is in New Hampshire. There is no question about the pollution of the water. There is no certainty of its improvement and no certainty that it will not become more polluted.
>
> * * * *
>
> Among the reasons for thinking that the pollution of the Merrimac is unlikely to decrease is the testimony of officials of New Hampshire. For example Charles D. Howard, Chief of the Division of Chemistry and Sanitation of the New Hampshire Board of Health, testified that there had been an unwritten but well understood public policy in New Hampshire, that the communities and industries of the state should not be burdened with the treatment of sewage or industrial waste. The Merrimack River has thus become a legalized public sewer. The conditions in this respect are practically beyond the control of Massachusetts as

> water taken from the Merrimack would be taken out at Tyng's Island about midway between the city of Lowell in Massachusetts and the New Hampshire line.
>
> A considerable amount of industrial waste from such factories as paper mills, tanneries, rendering works, cellulose plants, cotton mills, woolen mills, gas works, of which there are many in New Hampshire, is peculiarly difficult to eliminate from water." (Report of the Special Master, pp. 45, 46.)

However, the Special Master answers his own statement in regard to the pollution where we find in his report,

> "Every expert agreed that by treatment on the general lines indicated the Merrimack water could be made hygienic." (Report of Special Master, p. 46.) (Exception 59.)

The Complainant excepted to the following finding of the Special Master (Exception 59): "The Merrimack River has thus become a legalized public sewer."

This was based no doubt on the testimony of Charles D. Howard, that the policy of New Hampshire was not to burden communities and industries in that State with the treatment of sewage and industrial wastes. Such a policy is indefensible and is not an indication of the trend of the times; but it is reasonable to assume that New Hampshire and other New England States will adopt a forward-looking policy in the protection and conservation of their streams, as is now being carried out by Connecticut. (Wadhams, Joint Summary of Evidence, p. 142-150 incl.)

Mr. Knowles in 1917 stated in his report, "In the same year (1887) the Merrimac was declared an open sewer by the State legislature." (Joint Summary of Evidence, p. 302.) An examination of the Massachusetts statutes shows no such legislative enactment. The only thing which might lead one to that

impression is the limitations upon the jurisdiction of the State Board of Health in regard to the sanitary condition of the inland waters of the state. Such jurisdiction applies to all waters "with the exception of the Merrimac and Connecticut Rivers and so much of the Concord River as lies within the city of Lowell, and the ponds and streams over which the Metropolitan Water Board has control." (J. S. E., 218.) That there is no intention to declare the Merrimac an open sewer is supported by the fact "that in 1924 a plan was made to get rid of the sewage on the Merrimac River from Tyngsboro to the sea" and "that the project of building an intercepting sewer along the Merrimac River was considered because of the objectionable conditions complained of in that river below Lawrence and Haverhill down to the tidal portion of the river several miles below Haverhill." (J. S. E., 222-223.)

It will be remembered that Lawrence and Haverhill are many miles below the point where it has been suggested that water be diverted for use in the Metropolitan District. In spite of this plan to remove the sewage from the Merrimac River, the Special Master found on page 45 that "there is no certainty of its improvement and no certainty that it will not become more polluted." The fact that a plan has already been devised for taking sewage out of the river over such a large portion of the stream in the Commonwealth of Massachusetts, refutes this. Not only has a plan been prepared but the Chief Engineer of the Department of Public Health testified that the building of an intercepting sewer along the Merrimac was considered because of the objectionable conditions complained of in that river *below* Lawrence and Haverhill, and further that if one-third of the low water flows of the Merrimac River above Lowell should be diverted by the Metropolitan District for water supply purposes, it would probably bring about *the immediate construction of a*

*sewerage system or sewage disposal works*, whichever they chose to build; this, according to the Chief Engineer, *would be an inevitable consequence of the diversion.* (J. S. E., page 223.) In regard to improvement in the past, this was shown very clearly by Defendant's witness, Eddy, who presented figures showing the marked improvement of the quality of the water in the Merrimac River at the intake of the Lawrence filter plant, showing a reduction in the B. coli index of from 10,300 per 100 cubic centimeters in 1918 to 3,400 in 1929, and even going back to 1906 when the B. coli index was 16,700 per 100 cubic centimeters, and further the witness correctly noted that there is a decided drop in the records of the B. coli tests since 1921 when the index was 19,000 per 100 cubic centimeters and the decline since then has been marked and steady. (J. S. E., page 280.)

*Damages to water power interests in Lawrence and Lowell*

The Special Master found certain minor objections to the use of the Merrimac River water, among which was in regard to the needs of the factories of Lawrence and Lowell for water power. In his report he states:

> "The testimony does not enable me to make a definite finding thereon but I think there is a probability of this damage turning out to be serious to the existing factories and future factory operations at Lowell and Lawrence." (Report of Special Master, p. 48.)

The water power rights which would have to be acquired if water was diverted above Lowell includes certain power developments in these two cities. The value of these rights has been estimated by various witnesses at from one to eleven million dollars.

> (Jacobs, Joint Summary of Evidence, p. 183.)
> (Fuller, Joint Summary of Evidence, p. 274.)
> (Uhl, Joint Summary of Evidence, pp. 256, 257.)

Whatever the damage may be to these water power rights it was included in all of the estimates of cost of this project, concerning which the Special Master found,

> "So far as cost is concerned there is no vast difference between the schemes and any of them is within the means of Massachusetts." (Report of the Special Master, p. 48.)

However important the value of these water rights are as measured in dollars, the Special Master should not have given any weight to this matter in considering the diversion of water from the Merrimac River. In the first place there was no evidence put into the record to show what the damages are to the water powers in the Connecticut River tributaries. The Special Master found damages at one site in Connecticut of $80,000, but Massachusetts declined to furnish any information as to the water power damages which would be affected on the Chicopee River and its tributaries in the Commonwealth of Massachusetts. The record does show, however, that in asking the Great and General Court of Massachusetts for an appropriation to carry out this work, it was estimated that the cost of real estate, rights of way, business damages, water rights, diversion damages, and so forth, would be $12,015,860 (Defendant's Exhibit D-6). The record further shows that while none of the water rights have yet been acquired, practically 60% of the land has been acquired at a cost of approximately $4,200,000, leaving a balance of almost $8,000,000 for the remaining 40% of land to be acquired *and the water rights* as compared to possibly $5,000,000 on the Merrimac.

Furthermore, the Special Master should have found that the amount of water power which would be lost by this diversion was insignificant in comparison with the capacity of the enormous steam power plants which have now been developed

in these cities which is far in excess of the hydro-electric power which is available. (Joint Summary of Evidence, p. 182.)

And finally, in holding that the use of water power is an objection to the diversion of water for domestic purposes, the Master should have given weight to the pronouncement of the Joint Board.

> "While Massachusetts has abundant water resources, it must not be forgotten that there are other uses for water than those of public water supplies,—notably uses for power development and for recreation. The streams afford necessary drainage opportunities and the catchment areas cannot be given over entirely to water collection. Obviously there are many conflicting interests which must be adjusted. We believe that they can be adjusted satisfactorily if the water needs and resources are considered in a broad way, in a spirit of fairness, and with recognition of the possibilities which lie in modern science. *The use of water for domestic purposes should be recognized as having the highest claim,* but cities must strive to restrict waste and utilize trustworthy methods of water purification in order that existing supplies be maintained as long as economical considerations warrant their retention." (Exhibit C-1, p. 7.) (Italics ours.)

*Possible damages to navigation*

It was maintained that the use of the water of the Merrimac River for domestic purposes would result in damage to navigation in the lower reaches of the river. In this respect the Special Master found:

> "I have no means of finding out what the Secretary of War would do, but I think the navigation is important enough (and there are projects to improve it) to justify the conclusion that 200,000,000 gallons a day cannot with certainty be taken by Boston at Tyng's Island." (Report of Special Master, p. 49.)

On the other hand, the War Department has already found that the flow required by navigation is only 85 cubic feet per second. Massachusetts experts based their assumptions primarily on the action taken by the Secretary of War in regard to the Ware and Swift Rivers without giving any consideration whatever to the fact that the Connecticut River is an open tidal estuary, while the Merrimac River is slack-water navigation. And, although the Report of the Army Engineers on the navigation on the Merrimac River was referred to in the evidence, yet Massachusetts experts were not aware that the recommendations of the Army Engineers as set forth in this Report state that only 85 cubic feet per second were required for navigation as contrasted with the assumptions of Massachusetts experts, as set forth by the Special Master, as follows:

> "They (Massachusetts experts) say the Secretary of War doubtless would restrict the diversion on the same principle he applied to the Ware and Swift, namely, by limiting the diversion to flows in excess of .6 of a second foot per square mile of drainage area." (Report of Special Master, p. 49.)

This is equivalent to limiting the diversion to water in excess of a flow of 2,400 cubic feet per second. (Joint Summary of Evidence, p. 244.)

This limitation is suggested by Massachusetts witnesses as an aid or safeguard to navigation in spite of the fact that the Army Engineers' figures show that the greatest amount needed for navigation in the driest year would be 85 cubic feet per second (Joint Summary of Evidence, p. 182), which is a substantial variance from the finding of the Special Master; and we submit that there was not any competent evidence in the case upon which the Special Master could base such a finding.

It will be remembered that the report of the Joint Board in 1922, Complainant's Exhibit C-1, agreed with the report of 1895, Exhibit C-3, that the water supply from the Merrimac was "almost inexhaustible" (Ex. C-1, page 159). The Joint Board must have taken cognizance of the question of navigation on the Merrimac River, because both of the documents referred to by Dr. Winsor (J. S. E., page 215) were published prior to the Joint Board's report. The report on the Merrimac River, Defendant's Exhibit D-11, was published in 1914 and the report of the Secretary of War, House of Representatives Document 1813, Sixty-fourth Congress, second session, was printed January 2, 1917, and it was this report which found that the requirements of navigation on the Merrimac River were only 85 cubic feet per second. (J. S. E., page 182.)

*Possibility of a breakdown due to the human element in the purification process.*

In expressing their preference for an unpolluted source over purification of one known to be polluted at the outset, Massachusetts experts continually intimated the breakdowns in the purification processes and seemed decidedly disturbed by the so-called human element. They cited many things which might occur which would interfere with the purification process. These are set forth in Exhibit D-27, which Exhibit states as follows:

> "Even though modern means of purification of a polluted water supply be used there still remains the hazard of interruption of the processes of purification from one cause or another. The various causes of interruption in service are illustrated herein."

Exhibit D-27 lists thirty-four instances of alleged breakdowns in purification processes. These may be divided into groups of causes.

Breaks in Mains .....(6)

Breaks in mains are as likely to occur in an unfiltered supply as in a filtered one. The main supply for the present Metropolitan District from the Wachusett Reservoir to the Sudbury Reservoir is carried by one aqueduct only, the Wachusett. In plans for the supply from the Merrimac River parallel lines are included.

Chlorination Failure .....(6)

The possibility of interruption in chlorination process is admitted. There still remain, in the proposed Merrimac scheme, storage and filtration. Or until chlorination repairs could be made the entire supply could be drawn from Wachusett Reservoir.

Poor or Lax Operation .....(6)

Poor operation of a filter plant is on the same level as carelessness in patrolling a watershed from which an untreated supply is to be drawn and because of the triple processes used purification is more reliable in this respect.

Trade Wastes .....(2)

A sanitary survey of the Merrimac River above Tyng's Island reveals nothing in the drainage area as far as Concord, N. H., 45 miles above the intake, that would be objectionable, or impossible to treat in the plant proposed. Complainant's experts have testified that storage will effectually remove such trade wastes.

Structural Failures .....(3)

Witness Gregory (Record p. 2196, et seq.) explained the reasons for the failure at Baltimore, which was one of

the structural failures. He called attention to the error in Exhibit D-27 in that coagulation basins were not destroyed and the exhibit failed to explain that Baltimore immediately put into operation its second set of filters to treat the city water supply.

Floods .....(2)

The pumping station on Merrimac River as proposed is elevated well above the maximum flood that has ever occurred and there is no possibility of floods affecting either the Foster-Martin storage reservoir or the filter plant below it due to the small drainage area.

Character of the Raw Water .....(2)

Changes in the character of the raw water in the Merrimac River will be taken care of by the Foster-Martin detention reservoir, so that the quality of water delivered to the filtration plant by treatment will be practically uniform as a result of storage so that the conditions described as having happened at Detroit could not happen here.

Other causes .....(7)

Among these are abnormal draft, alterations to plant, short circuiting, freezing, defective pump packing, and one item of general breakdown at Philadelphia where the data are not given.

All of these objections in regard to the possibility of the human element in the operation of such a water works system as that proposed for the development of the Merrimac River were summed up and answered by defendant's witness, Winslow, an undoubted authority on water supply and public health matters.

In regard to the human element in the operation of municipal water works, Professor Winslow stated:

> "I think the human element is, on the whole, more important in these stored supplies than it is in a treated supply, because in such storage supplies as now are used by Massachusetts the safety of the city depends on the efficacy of patrolmen and people who are watching the reservoirs, where there is a far greater element of danger than there would be in the operation of a modern mechanical treatment plant.
>
> Q. What you say about stored waters of the Metropolitan District isn't borne out by any disease statistics that you have, is it? A. No.
>
> Q. Boston's typhoid record is as good as any city, isn't it? A. Excellent, yes, and I think it would continue to be with a more scientific type of treatment.
>
> Q. But the scientific type of treatment, for what it is worth, can be applied just as well to the stored waters of the Metropolitan District as to the polluted Merrimac water, can't it? A. That is what we are proposing to do, store the water of the Merrimac until it is about as pure as the present supplies, and then filter it and chlorinate it.
>
> Q. So that the possible breakdown of the municipal government in this respect wouldn't affect your judgment at all as to where you went for the water? A. I can't conceive of a possibility of breakdown with a 60 or 90 days' storage and the treatment plan here provided. (Joint Summary of Evidence, pp. 208-209.)

Professor Winslow further testified, referring particularly however to the 15-watershed plan:

> "The chief argument, as I get it, against the sanitary quality of these supplies was the fact that they came from thickly populated areas. I think that is a real, but a very minor element in judging of suitability for treatment. On the one hand, I should say that, well,

> certainly a large number of the worst typhoid epidemics on record have occurred on almost uninhabited areas, where the sewage from a single farm house has got into a stream. Plymouth, Pennsylvania, Butler, Pennsylvania, New Haven, have been mentioned here. One could cite scores of such instances. Therefore, a limited population is no safeguard. Nor is a considerable population on a watershed necessarily a menace. It depends entirely on the actual conditions which exist. One might consider, for example, such a reservoir as the Chestnut Hill distribution reservoir of Boston, surrounded by crowded apartment houses, and yet much freer from the danger of pollution than many remote lakes. Therefore, I think the only real test is the quality of the water as indicated by the methods which science gives us." (Testimony, pp. 2256-7.)

Professor Winslow was emphatic in placing reliability on modern methods of treatment as against the unreliability of patrolmen in looking after mountain supplies coming from areas where there is comparatively small population.

Referring specifically to the Merrimac River project Professor Winslow testified

> "That breakdowns in water plants have been rare in relation to the number of plants operated; that they have been either due to flooding, or to breakdown of smaller filter plants, or to instances where simple chlorination is used with no other precaution; (2262) *that he knew of no instance in the history of public health of the failure of such a plan as is proposed for treatment of the Merrimac River;* that the Merrimac River plan provides a triple safeguard; that one of the three elements of the protection might break down once in 10 years; that two of them might break down simultaneously once in 36,500 years; that three of them would fail to work on the same day once in 133,000,000 years." (Joint Summary of Evidence, pages 213-214.)

*Public opinion*

The Special Master found that one of the principal objections to the use of Merrimac River water was that of public opinion. The importance which he attached to this feature of the case is reflected in the following quotation from his report:

> "The first fact, and I think it quite important, is that the people of Massachusetts have decided against the eastern water supplies by passing the Ware and Swift legislation." (Report of Special Master, p. 29.)

> "I think these investigations and the legislative acts show a public sentiment against the eastern water supplies and make a prima facie case that these supplies are inadvisable, either because inadequate or unfit." (Report of Special Master, p. 30.)

> "The Connecticut experts except Professor Winslow, expressing preference for a supply of pure water over a polluted supply, also said that public opinion has to be considered and sometimes is controlling; that is that a settled opinion (it may be prejudice) is to be regarded." (Report of Special Master, p. 47.)

> "Our governments in the long run are controlled by public opinion." (Report of Special Master, p. 50.)

The above quotations indicate that the Special Master gave undue weight to the question of public opinion, entirely overlooking or ignoring the fact that public opinion is merely a preference, a choice, and possibly a public manifestation of ignorance of the true conditions. Public opinion favors the tried as against the untried. It often favors the continuance of the old and obsolete as against the new and modern. Public opinion may still prefer the clear, sparkling water even though it be dangerous and unknowingly contaminated, to a less attractive water physically which has been carefully and scientifically treated.

Furthermore in regard to the influence of public opinion in deciding matters of this kind public opinion when properly educated will realize the needs and advisability of adopting modern methods. Professor Winslow stated:

> "that every well regulated Health Department has its division of Health Education and one of its chief duties is to produce modifications of public opinion in the line of scientific development, such as immunization against typhoid and diphtheria, control of tuberculosis, regulation of diet, and pasteurization of milk; that he believes it would be possible to convince the citizens of Massachusetts that the prejudice against the Merrimac supply was unreasonable." (Joint Summary of Evidence, p. 214.)

It will be remembered that it was Mr. Eddy who cited and presented in defendant's Exhibit D-27 the tabulations of interruption in the purification processes. Mr. Eddy in a report at Cincinnati stated:

> "While there may be sentimental objections to the discharge of sewage into this river from which a domestic water supply was taken, such objection should not prevail against reason and experience which demonstrate that this water when properly treated is an acceptable and potable water for domestic consumption." (Joint Summary of Evidence, p. 289.)

This shows Mr. Eddy's willingness to educate public opinion to accept modern methods of scientific treatment.

The bacterial condition of the Ohio River at Cincinnati was found to be 2,980 colon bacilli per hundred cubic centimeters (Joint Summary of Evidence, p. 204), as compared to 3,400 in the Merrimac (Joint Summary of Evidence, p. 280), so that there was little difference in the quality of the two streams.

Referring to the Ohio Mr. Eddy wrote in his report:

> "A careful study of the bacterial tests of the water treated in the Cincinnati water filtration plant indicates that this plant is capable of successfully handling any water likely to be delivered to it under present conditions." (Joint Summary of Evidence, p. 290.)

And in regard to the Ohio River, Mr. Eddy testified:

> "that most of the cities along the Ohio River discharge their sewage into the river, and that this water when properly treated is a safe and potable water for domestic consumption;" (Joint Summary of Evidence, 290).

*Modern trend towards the adoption of filtration in the protection and preparation of a public water supply*

Much evidence was produced in regard to the adoption of filtration and purification processes as compared to the use of comparatively unpolluted sources. In regard to this preference, the Special Master found:

> "Dr. Rudolfs testified that he thought the treatment proposed (some storage, filtration and chlorination) would furnish a safe water, but admitted that other things being equal he would prefer a supply of pure water to polluted water." (Report of Special Master, p. 36.)

> "I think the experts on water and pollution called by the plaintiff and defendant are equally competent and honest in their views. The difference between them seems partly to be a difference between two schools of thought. One looks most favorably on the sinner repentant, the other will have none of him except on compulsion. The one school has the fullest confidence in the processes involved in modern treatment of polluted water and lays less stress on pure source of supply. It suffices them to feel that water will be delivered to the consumer pure. The other school is

> skeptical about the infallibility of water purification processes and seeks waters that are pure at the source." (Report of Special Master, p. 40.)

Mr. Eddy also testified (Joint Summary of Evidence, p. 290), that Cincinnati and Louisville had storage of their water in 1912 and 1913 and that the result obtained by something like five days storage on the fill and draw principle with two reservoirs produced an excellent result from a bacteriological standpoint; that forty or fifty years from now it may be "that we won't drink any water unless it is scientifically treated"; that he would say that is almost the case today; that he built a plant at Greenwich, Connecticut, which has pre-aeration, pre-chlorination, storage for sixty or ninety days, coagulation, sedimentation, filtration, chlorination, and post-aeration,—all that is practically possible to do at the present time to make polluted water safe; that he thinks they are getting very good water in Greenwich.

One school of thought prefers to trust to an unpolluted stream while the other school desires to deliver to the public a pure water and applies modern science to guarantee the safety of the final product delivered. This is a matter of choice or preference, even though this choice or preference be that of a technical expert. But, the exercising of a preference involves the premise that the choice might be made freely and unhampered. Such is not the case with interstate waters.

All the witnesses agreed that plants for filtrating and purifying water are now in constant use, and purifying water for domestic use, not only for cities throughout the United States, but in the largest cities of the world. This was a fact which was shown, not only by the evidence of the eminent witnesses who testified, but also by their experience in building such purification plants.

Mr. George W. Fuller, a witness called by the defendants, stated (Joint Summary of Evidence, p. XLII):

> "I particularly had to do with the selection of type, design and supervision of construction and operation of numerous sizable water purification plants such as those at Louisville, Cincinnati, Little Falls (East Jersey Water Co.), Hackensack Water Co. plant at New Milford, New Jersey, Philadelphia, Baltimore, Washington, Richmond, Memphis, Dallas, New Orleans, Kansas City, Minneapolis, Buffalo, Montreal, and many other smaller plants."

Mr. Harrison P. Eddy, who testified to vast experience in sewerage works, "recommended the filtration of the water supply and the treatment of the sewage" at Milwaukee. (Joint Summary of Evidence, p. XXXVII.)

Mr. Frank A. Barbour, an expert for Massachusetts, listed among his experiences the filtration plants at Marblehead, Mass., Frederickton, N. B., Montreal, Canada, and Akron, Ohio. (Joint Summary of Evidence, p. XXXIII.)

Mr. Robert Spurr Weston, an expert witness for Massachusetts, gave among his important works the construction of filtration plants at (Joint Summary of Evidence, p. XX),

"Amesbury, Mass.
United Fruit Company, Cuba.
Belfast, Maine.
Cohasset Water Company, Mass.
Exeter Water Works, N. H.
Gorton Pew Fisheries, Gloucester, Mass.
Hartford, Conn.
Hartford Water Company, Vt.
Keene, N. H.
Merrimack, N. H.
Middleboro, Mass.
Mt. Holyoke College, Mass.

New Market, N. H.
Oklahoma City, Okla.
Oldtown, Maine.
Reading, Mass.
Sayles Finishing Plants, R. I.
Sayles-Biltmore Bleacheries, Asheville, N. C.
South Orange, N. J.
Wakefield, Mass.
and other places."

Dr. Frank E. Winsor, an expert witness for the defendant, testified he was "Chief Engineer on the design and construction of a new water supply for Providence, Rhode Island—which supply included—the filtration plant of 50,000,000 gallons capacity." (Joint Summary of Evidence, p. XVII.)

The Complainant excepted to the failure of the Special Master to find that the expert witnesses for Massachusetts were in substantial accord that the present source of supply should be treated. (Exception 60.)

Massachusetts experts stated that in their opinion the water supply now in use by the Metropolitan District should be safeguarded by treatment.

(Barbour, p. 268; Eddy, p. 283, Joint Summary of Evidence.)

The developments in the art and science were well summed up by Professor Winslow and we quote his testimony in full (Testimony, p. 2259):

"I agree heartily with what Mr. J. Waldo Smith said this morning, that we are going to make progress in social comity and in co-operation between states, which is the real way to settle such problems as are involved in the Merrimac and Connecticut. Finally I think the

really sound lesson in regard to this question is to be drawn from the experience of northwestern Europe for a population concentration far in excess of what we may reasonably expect here has already been reached, where industrial development as in Belgium and in northwestern Germany is on a colossal scale and where water supplies have been taken for 25 years from highly polluted streams running through industrial districts and treated with complete success. I think if any thing the tendency of the future in this country, as far as I can forecast it will be along this line, towards the more scientific and more intensive use of our water resources rather than along the line of an attempt to discover the ever-receding Gardens of Eden which require no repentance. I may say I was brought up like the other experts on this innocence and repentance theory, but experience has made me a convert to the doctrine of original sin. I would rather insist on wholesale repentance in all cases.

MR. WARREN. That is the reason you prefer we should have a polluted source rather than a pure one, is it?

THE WITNESS. I would rather have the sinner who has repented than the supposed innocent who has not, Mr. Warren."

*Methods of scoring water supply*

Mr. Eddy produced a method of scoring water supply where he attempted to rate the water supplies, depending upon the quality of the water and the methods of treatment.

Before considering Mr. Eddy's methods of rating, one should not lose sight of the fact that the quality of the raw water of the Merrimac River even down at Lawrence, which is

below Lowell the point of major pollution of the stream, is not materially different from the conditions in other rivers. The condition of the river from a hygienic standpoint was measured by the experts by the use of what was known as the B. Coli index which is the statement of the number of B. coli present in 100 cubic centimeters of water. The B. Coli index thus derived for a number of water sources used by other cities was testified to by defendant's witness, Eddy (Record, p. 2060) and plaintiff's witness, Winslow (Joint Summary of Evidence, p. 204), and for convenience we tabulate their testimony as follows:

| | *Colon Bacilli per 100 Cubic Centimeters* | |
|---|---|---|
| *City* | *Winslow* | *Eddy* |
| Henderson, Ky. | | 1,740 |
| Toledo, Ohio | 1,980 | 1,650 |
| Pittsburgh, Pa. | 2,058 | |
| Louisville, Ky. | 2,220 | 2,220 |
| Huntington, W. Va. | | 2,370 |
| Grand Rapids, Mich. | 2,563 | |
| East Liverpool, Ohio | | 2,680 |
| Trenton, N. J. | 2,891 | |
| Cincinnati, Ohio | 2,980 | 2,980 |
| St. Louis, Mo. | 3,120 | |
| *Lawrence, Mass.* | *4,200* | *3,400* |
| Portsmouth, Ohio | | 3,490 |
| Evansville, Indiana | | 3,940 |
| Reading, Pa. | 4,219 | |
| Youngstown, Ohio | 5,450 | 6,930 |
| Philadelphia, Pa. | 5,899 | |
| Niagara Falls, N. Y. | | 8,290 |
| Elmira, N. Y. | | 9,450 |
| Ashland, Ky. | | 11,500 |
| Ironton, Ohio | | 14,900 |
| Kansas City, Kans. | 15,892 | |
| Albany, N. Y. | 19,400 | 19,400 |
| Chester, Pa. | | 20,500 |
| Indianapolis, Ind. | 22,500 | |

Professor Winslow carefully analyzed Mr. Eddy's testimony and Exhibit D-28 on his method of scoring. In this connection he testified that

> "he had examined Mr. Eddy's score of water supplies: that a water supply is supposed to be satisfactory if its total number of points equals 100; that a total of 91 can be obtained on raw water alone without reference to subsequent treatment used; that population per square mile is the governing factor in the score as any wide variation in that item cannot be overcome by other items; *that water distilled from the Merrimac River or from the Lea River used by London would be penalized 40 to 60 points out of 100 because of the source from which it* originally came; that the Eddy score is of no substantial significance with regard to the quality of a water; (2269) that the population of the United States in general is going to be stable very shortly and that his studies indicated that Massachusetts would not be exceptional in that regard; (2270) that if the ultimate quality of the water delivered were the same, the cost the same, and the relative effects upon other communities were the same, it would be a matter of indifference what the quality of the RAW water was;" (Joint Summary of Evidence, p. 214.)

> "In view of these results I can not think this method scoring is likely to be received as a substantial contribution to engineering science." (Testimony Winslow, p. 2267.)

*There are available in Eastern Massachusetts other supplies than the Merrimac River.*

Mr. Jacobs, an expert witness for Connecticut, testified (Joint Summary of Evidence, page 168), that if the Merrimac project were adopted, additional supplies would not be required but that there were other sources of supply in eastern Massachusetts which he had studied and found available. He described a plan for taking water from the Ipswich River, the

Shawsheen River, the Assabet River, the Lower Sudbury River and from portions of the South Sudbury River not at present used by the Metropolitan District. He described the availability of these waters and submitted a plan whereby they could be developed and yield the district 157,000,000 gallons per day (Joint Summary of Evidence, page 160). This plan was described as the 15-Watershed Plan.

In substance, and with the exception that Mr. Jacobs' plan included the waters of the Shawsheen River, the 15-Watershed Plan corresponds with the plan for using these water supplies by the Metropolitan District recommended in House Document No. 900, Massachusetts, 1925 (Exhibit C-2).

In House Document No. 500 of 1895 it was recommended that the waters of the Assabet River should be taken when needed as the first addition to the Wachusett supply. When the time came for adding to the Wachusett supply it was found (Exhibit C-1) that 11,000,000 to 17,000,000 gallons per day was available in the Assabet River.

*These supplies have never been developed*

The report of the Metropolitan Water Supply Investigating Commission (House Document No. 900, Mass. 1925, Exhibit C-2) was considered by the Great and General Court but its recommendations were rejected in favor of the recommendations contained in House Document 1550, 1922 (Ex. C-1), for the development of the Ware and Swift Rivers.

Dr. Winsor for defendant testified (Joint Summary of Evidence, pages 19 and 20), that there had been no development of the "available additions of substantial amounts which can be made to the present Metropolitan water supply from comparatively nearby sources."

*Massachusetts admits the availability of certain portions of the water in the 15-Watershed Plan*

In the agreed statement of available water supplies in northeastern Massachusetts (page 159, Joint Summary of Evidence) there are included the Ipswich River, good for 70,000,000 gallons per day, and the Assabet River, good for 15,000,000 gallons per day through the year 1970. It is noted in the Joint Summary of Evidence that these supplies are *available but not developed.* The availability of Ipswich River water is further attested by the fact that Massachusetts' witnesses submitted a plan (Exhibit D-25) for the combination of Ipswich River water with Merrimac River water to yield 191,000,000 gallons per day (Report of Special Master, p. 49).

In connection with the admitted availability of the Ipswich River in the amount of 70,000,000 gallons per day it should be noted that on page 160 of the agreed statement of available water supplies, the Ipswich is included, as per the Hazen recommendation. This refers to the recommendation of Allen Hazen as consulting engineer of the Metropolitan Water Supply Investigating Commission reported in House Document No. 900 of 1925, Mass. (Exhibit C-2). The recommendations of Mr. Hazen for developing a water supply from the Ipswich included the installation of a filter plant for treating the water before its use by the Metropolitan District. The Hazen recommendation also included the construction of reservoirs in the Ipswich valley substantially as outlined by Mr. Jacobs for the Complainant. These reservoirs were objected to by Massachusetts' expert witnesses, the reason being that they would be located upon the Wenham Swamp (Report of Special Master, page 38). It is only by the construction of reservoirs that a yield of 70,000,000 gallons per day can be obtained from the Ipswich River which is agreed to be *available but undeveloped.*

*Abandonment of these supplies is unnecessary*

The Special Master found (Report of Special Master, p. 39), that the supply from the 15-Watershed Plan would be of "uncertain duration."

The basis for this finding of the Special Master is found in the testimony of expert witnesses for defendant, who pointed out the encroachments of permanent and transient population on the watersheds of the sources of supply included in the 15-Watershed Plan, together with the avowed policy of Massachusetts to abandon polluted river sources of supply in favor of upland streams as against rendering these river sources useful by modern means of treatment. But it is agreed by defendant that 70,000,000 gallons a day available in the Ipswich will be good until 2000 A. D. and 15,000,000 gallons per day in the Assabet until 1970 (Joint Summary of Evidence, p. 159), so that the element of uncertainty in the duration of these supplies does not enter the picture for at least 40 years in the future. Mr. Eddy testified for defendant (Joint Summary of Evidence, p. 290) that:

> "40 or 50 years from now it may be that we won't drink any water unless it is scientifically treated."

The expressed policy of Massachusetts with respect to the preservation of the purity of the surface water supplies, is found in Exhibit C-1, pages 10 and 11, previously quoted on page 177.

The carrying out of this policy and the interpretation of how far it is practicable to go in the use of natural agencies of purification together with the decision between filtering and abandonment, are described by witness Winsor for defendant (Joint Summary of Evidence, page 14), who testified concerning the disposition of certain water supplies now in use, when the municipalities owning those supplies applied to the Metropolitan District for admission;

"that when the Metropolitan District takes in the additional population, the District will not necessarily take over the water supplies now used by this population; that they may abandon that supply . . . . . that he has no plans as to what will be done with this water supply that will be discontinued; that it doesn't come under his jurisdiction; that he has not made any study to enable him to advise as to its ultimate destination; that as a rule those supplies are nearing the end of their usefulness, . . . . . are obtained from waters that are polluted by large population . . . . that as to what they are going to do with that water, there is no reason why that should be of any interest to him; . . . . . that he has nothing whatever to do with looking over any water supply in any community to see of what use it can be made and that he doesn't know anyone who has—if they do, he doesn't know who it may be; . . . . ." that the future contemplates "the abandonment of the supplies of these towns that are now supplying themselves, that are within the 10 mile radius, that though he hadn't thought of it in just those terms, but that is what it would amount to."

*The 15-Watershed Plan plus present supplies adequate for Metropolitan District*

It is agreed (Joint Summary of Evidence, page 160) that the 15-Watershed Plan, according to Connecticut witnesses, will yield 179,000,000 gallons per day. The Special Master found that (Report of Special Master, page 39) "Boston might make available a considerable amount of water from the sources referred to and in the manner referred to, or in some other manner."

The Special Master further found, however, that the water to be realized from the 15-Watershed Plan would be "an inadequate supply" (page 39).

The agreed statement of water supply requirements (Joint Summary of Evidence, page 159) shows that the 1970 demand for water by towns now members of the Metropolitan District will be 265,000,000 gallons per day and that the 15 towns eligible for membership in the Metropolitan Water Supply District, but not now members, will have a demand in 1970 for an additional 50,000,000 gallons per day, making a total of 315,000,000 gallons per day required by all the 35 cities and towns eligible for membership in the Metropolitan Water District.

The Metropolitan District will have available by 1970 (Joint Summary of Evidence, page 159 agreed statement) 134,000,000 gallons per day from its present sources of supply and there will be an additional 18,000,000 gallons per day available from the sources of supply of the 15 towns eligible for membership in the District, making a total of 152,000,000 gallons per day. Of the 179,000,000 gallons per day available in the 15-Watershed Plan, 22,000,000 gallons per day will be required by communities not members of the Metropolitan Water District but located in the vicinity of some of these supplies (Joint Summary of Evidence, p. 160). This leaves 157,000,000 gallons per day (subtracting 22,000,000 from 179,000,000) to be added to the 152,000,000 gallons per day, or 309,000,000 gallons per day available for the 35 cities and towns of the Metropolitan Water District. This supply will be adequate to satisfy the expected requirements of these towns practically until 1970.

## XIII. NECESSITY

*Sufficient supplies exist for Metropolitan District and Northeastern Massachusetts*

As we have shown before, under the heading of "Available Water Supplies in Eastern Massachusetts," there are ample water resources in Eastern Massachusetts to supply not only

the Metropolitan District but also Northeastern Massachusetts for many years to come. It is agreed by the witnesses called by the Commonwealth of Massachusetts that the present developed water supplies, taking the entire section of the State altogether, are in excess of present demands. As shown on Joint Summary of Evidence, page 159, there are 258,000,000 gallons per day available and only 244,000,000 gallons per day required. It is conceded that these 258,000,000 gallons per day can be increased immediately to 343,000,000 gallons per day without using the Merrimac River. (70 M. G. D. from the Ipswich and 15 M. G. D. from the Assabet *available but not developed.*)

*If the Ware and Swift water cannot be obtained, Eastern supplies can be made available.*

The Complainant excepts, however, to the failure of the Special Master to find that the Massachusetts experts testified that if the Ware and Swift waters could not be obtained, Northeastern Massachusetts could be adequately supplied with water (Exception 66) and failing to give legal effect to this testimony by finding that no necessity exists for the contemplated taking of water. (Exception 74.)

We have previously discussed, under the heading of "Available Water Supplies in Eastern Massachusetts," the fact that all of the Massachusetts' experts admit that, if the waters of the Ware and Swift were not available, these waters in the Eastern watershed of Massachusetts could safely be used for supplying the public. The Special Master found,

> "I have been much interested and impressed by the evidence of the water experts which puts it beyond question that polluted waters by proper treatment may be made hygienic. The experts convince one that even sewage by proper treatment makes an innoxious beverage." (Report of Special Master, p. 45.)

Mr. Karl R. Kennison, a witness for Massachusetts, testified that he

> "has made a study of what might be done with the Merrimac River provided that the Metropolitan District was forced to go to it for additional water; that in his opinion a more practicable scheme would be what might be called flood water only from the Merrimac River."
>
> (Joint Summary of Evidence, p. 244.)

Mr. Kennison was asked by counsel for Connecticut.

> "If by any chance you cannot get the Ware and Swift, it is going to be necessary for you to go to the Merrimac, isn't it?"

The anfractuosities of the witness caused counsel for Connecticut to inquire again:

> "As an engineer, you do not want to go on record as saying that you could not furnish Boston with a supply for 1970, if you had to, from the Merrimac and other eastern supplies?"

to which Mr. Kennison replied, "It is physically possible to do so." (Joint Summary of Evidence, p. 253.)

Similar admissions were made by other Massachusetts witnesses.

Mr. J. Waldo Smith, an expert witness for Massachusetts, testified (Transcript, p. 2176),

> "Q. (By Mr. Averill.) If you can't get the Ware and the Swift then it is going to be necessary to take something in the eastern part, isn't it?
>
> A. Oh, if you couldn't get the Ware and the Swift, you couldn't let the people die of thirst.
>
> Q. Well, they wouldn't, would they?
>
> A. I don't suppose they would.

Mr. Weston E. Fuller testified (Joint Summary of Evidence, p. 275), that if the Ware-Swift as a water supply for Massachusetts was eliminated from the picture, it would be possible to get a supply from the Merrimac, which ordinarily would be safe.

Mr. Frank A. Barbour testified (Joint Summary of Evidence, p. 270),

> "that he agrees that there is no doubt that the water of the Merrimac River could be used for the water supply of the Metropolitan District if necessary, provided it were properly filtered."

*The burden was on Massachusetts to show that no supplies existed in Eastern Massachusetts.*

The Complainant excepts to the construction being given to the reply to the defendant's answer. The claim of necessity and emergency is an affirmative defense of Massachusetts which should be shown to be of "great magnitude" and proven by "clear and convincing proof." (Exception 67.)

The Commonwealth of Massachusetts pleaded in its answer that it requires a suitable supply of pure and unpolluted drinking water, which can be obtained from no other source within the Commonwealth except from the watershed of the Connecticut River. (Reprint of Answer, p. 30.)

The burden was, therefore, upon the defendant to prove those positive averments. The Special Master states in his report,

> ."In addition Connecticut alleges by an amendment to its bill that the Boston district can well be supplied with good water from the eastern part of Massachusetts and for this reason should be enjoined from subtracting in the least from flow of water into the Connecticut."
>
> (Report of Special Master, p. 6.)

Whereas the Special Master should have found that Massachusetts has not met the burden of its averment. Its reports have shown available sources of water in Eastern Massachusetts and have shown that these could be developed. (Exhibits C-1, C-2 and C-3.) And, as shown above, it has been conceded that these supplies could be made available by proper treatment.

*Purifying of water feasible, practicable, and generally accepted in the larger cities of the world.*

In determining the question of necessity weight should have been given to the testimony that contaminated or polluted waters can be scientifically treated and rendered into a pure and wholesome product for domestic use. This testimony, given in detail under the heading of "Available Water Supplies" shows that supplies even more polluted than any suggested for the use of the Metropolitan District are being used in the largest cities of the United States; and furthermore, that these plants have been built under the engineering guidance of the expert engineers who testified for Massachusetts in this case. The Merrimac River is now being used by the City of Lawrence (Joint Summary of Evidence, p. 183), the Ipswich River is being used by Lynn and Saugus (Joint Summary of Evidence, p. 218); and in the face of the additional water which is available from these sources alone, it cannot be contended that they are not available for the use of the Metropolitan District and other cities in Northeastern Massachusetts.

*In determining necessity the abandonment of usable supplies should not be considered*

The Complainant excepted to the effect given by the Special Master to the announced intent on the part of Massachusetts to abandon existing supplies of water because when an emer-

gency or necessity is claimed to exist of sufficient importance to warrant the taking of waters in which another state has an interest, the policy of abandonment of existing supplies should not be permitted. (Exception 69.)

One of the arguments advanced by Massachusetts is the fact that, with the lapse of time, sources of water supply must be abandoned because of pollution. It is set forth by Massachusetts witnesses that, although the present supplies now developed by the Northeastern Massachusetts municipalities are capable of delivering 258,000,000 gallons per day, it is estimated by them that these supplies will yield only 204,000,000 gallons per day in 1970, and 186,000,000 gallons per day in the year 2000. Further, they anticipate that, although the Assabet is now available for an emergency supply of 15,000,000 gallons per day, yet they estimate that by the year 2000 this source will no longer be available.

Before the Commonwealth of Massachusetts can prevail in its plea of necessity it must show that it is doing everything not only to utilize but also to conserve the assets which it now has. It is, of course, true that any large community, growing in population, finds itself requiring more water from time to time to supply its inhabitants. So long as the Commonwealth can confine itself to its own resources it may be liberal in authorizing such a community to take additional supplies for such purposes and to abandon other supplies rather than protect and conserve them; but, on the other hand, when they find it expedient to demand and abstract the waters which naturally flow into another state, and to obtain their supply from such sources, then the same degree of liberality does not exist; and the complete development and conservation of its own resources must be antecedent to the diversion of the waters which naturally flow into another state.

*In determining necessity the use of water for industrial and recreational purposes should not be considered*

The Complainant excepts to the undue consideration given by the Special Master to the use of water for industrial and recreational purposes. In view of the claim of Massachusetts that the first and highest use of water is for domestic use, we claim that such policy should be applied in the case of their own waters before permitting them to take water in which another state has an interest. (Exceptions 71 and 73.)

Great weight was laid by witnesses testifying for Massachusetts upon the supposition that the water resources of Eastern Massachusetts were primarily necessary for industrial and recreational purposes and process water; and that, therefore, they were not available for use by the Metropolitan District and the communities of Northeastern Massachusetts for water supply purposes.

> ". . . . to maintain a proper flow in the Ipswich River and furnish waters to industries at Ipswich;"
>
> (Goodnough, Joint Summary of Evidence, p. 218.)
>
> "that some of the factories on the Assabet use great quantities of water in the manufacturing processes, the chief of which is the American Woolen Company's mill at Maynard,"
>
> (Goodnough, Joint Summary of Evidence, p. 222.)

The Great and General Court of Massachusetts has given weight to the consideration of the use of the waters of the Commonwealth for recreational purposes as compared to water supply purposes. In Ex. C-1, p. 1, in the Act creating the Joint Board the legislation states,

> "The said board shall also consider and report whether any of the great ponds now used as sources of water supply might better be devoted to purposes of public recreation."

In making its report, the Joint Board took cognizance of the use of water for power and recreation, showing that the conclusions reached were not those compelled by necessity. At p. 7 (Ex. C-1), the report says:

> "While Massachusetts has abundant water resources, it must not be forgotten that there are other uses for water than those of public water supplies,—notably, uses for power development and for recreation. The streams afford necessary drainage opportunities and the catchment areas cannot be given over entirely to water collection. Obviously there are many conflicting interests which must be adjusted. We believe that they can be adjusted satisfactorily if the water needs and resources are considered in a broad way, in a spirit of fairness, and with recognition of the possibilities which lie in modern science. The use of water for domestic purposes should be recognized as having the highest claim, but cities must strive to restrict waste and utilize trustworthy methods of water purification in order that existing supplies be maintained as long as economical considerations warrant their retention."

The report states (Ex. C-1, p. 11):

> "the people's representatives have wisely acted on the principle that the highest use of all the inland waters is that of supplying water for domestic needs."

The conflict of interests is recognized at p. 27 (Ex. C-1):

> "The problem is complicated from the standpoint of water supply because these ponds are also attractive for recreational purposes."

In considering the Merrimac River as a source of supply for the District, the conflict of interests was again apparent (Ex. C-1, p. 162):

> "The use of the Merrimac River would sooner or later reduce materially the quantity of water available for power in this important stream."

*Necessity does not mean that a choice can be made of available supplies*

The Complainant excepts to the finding and conclusion of the Special Master that the Commonwealth of Massachusetts has the choice of using waters in which it is solely interested or taking waters in which another state has an equal interest regardless of the fact that its own waters can be made available for use. (Exception 70.)

The Special Master gave principal consideration to public sentiment in the choice of supply. While it is true that engineers will give this opinion consideration in determining the advisability of a supply yet, in determining its availability as the ground for pleading necessity, it can be given no weight. The only question, therefore, was whether the supplies were available, whether they could be used, and not whether Massachusetts, by its legislation, chose to use them.

The Master has implied that public opinion compelled the decision of the Massachusetts legislature to take the Ware-Swift waters. He found (Report of Special Master, p. 51):

> "The courts, it seems to me, cannot close their eyes to the necessities imposed by public opinion on governments."

If there was any necessity imposed on the Massachusetts Great and General Court in the matter of the proposed water supply for the Metropolitan Water District it was that of choosing between the Goodnough plan on the one hand (Ex. C-1) and the Gow plan on the other hand (Ex. C-3). There was as much public opinion in opposition to the former following its pronouncement in 1922 as there was to the latter in 1925. This is shown at Ex. C-2, p. 13, 14.

*The decision of Massachusetts not to use water which can be made safe for consumption should not be a governing factor in determining necessity.*

The Complainant excepts to the finding by the Special Master that the determination that Massachusetts has decided not to use the supplies existing in Eastern Massachusetts but to take the waters of the Connecticut watershed is the most important factor to be considered when a proposed taking of water in which another state has an interest is involved. (Exception 72.)

The Special Master found,

> "Undoubtedly the Ware and Swift acts express the settled opinion of the Boston District and of the state . . . . Our governments in the long run are controlled by public opinion . . . . The courts it seems to me cannot close their eyes to the necessities imposed by public opinion on governments."
>
> (Report of Special Master, pp. 50, 51.)

As stated above, this decision by the Great and General Court of Massachusetts that this constituted necessity, is not material in this case, because of its interstate nature. If the Commonwealth of Massachusetts as a sovereign desired to take property within its own territory for a public use, its determination through its legislative department of the necessity for the taking would be conclusive upon all other departments of government within that Commonwealth. As a practical proposition a determination that the use to which the property is to be put is a public use, is sufficient to determine that the state of necessity exists. Where such a condition is found by the legislature to exist, the mere statement by that legislative authority that the taking is necessary must be accepted by all other departments of the government without review. This

Court has held that the determination of necessity is a purely legislative matter and is not a subject of review by the Court.

(United States v. Chandler, Dunbar Co., 229 U. S., 53, 64.)

*The necessity claimed must be an alternative for the exercise of eminent domain and should be construed strictly against the state claiming it*

Inasmuch as this Court has held that the determination of the question of necessity, where a sovereign acts within its unquestioned power, is not reviewable, there is more reason to claim that, in the absence of any authorizing legislative act, this Court cannot substitute necessity for a legislative act. If the question of necessity for the taking of private property for public use is a legislative power of such a nature that it cannot be reviewed by the judicial department, then it must follow that the judicial department cannot of its own motion substitute necessity for such legislative act. Therefore, when the Commonwealth of Massachusetts pleads that, by reason of a great emergency existing within its boundaries, it must take the waters of the Ware and Swift because no others waters can be obtained, it is substituting the doctrine of necessity for the power of eminent domain.

*Eminent domain is a legislative function of government*

As has been shown above, the Commonwealth of Massachusetts is without the power of eminent domain to take property located in the State of Connecticut. It now proposes to substitute the doctrine of necessity, and claims that an emergency for an additional water supply justifies the general rule as to the taking of property. It must, if this doctrine is to be followed, necessarily mean that where a state desires property or property rights located within another state, which it has no power to take under its sovereign power of eminent domain, if

the emergency of necessity is great enough, it will not only justify its taking the step but that it will even justify this Court in authorizing or consenting to the taking of property for public use without the exercise of the power of eminent domain.

*Determination of necessity is not a judicial function*

If this doctrine of necessity is held up as justification for taking property without the exercise of the power of eminent domain, it must follow that, when this Court is asked to condone such a taking on the doctrine of necessity, it is being asked to apply a doctrine which is essentially legislative in its character. Such authority was never given to the courts. Such doctrine does not exist in American jurisprudence as the doctrine of necessity, as applied to subjects of a different sovereignty. On the ground of necessity, Massachusetts may do anything she desires within her boundaries, so far as her constitution and her sovereignty permit, but she cannot go beyond that. She is seeking some other legislative authority for such action.

*Remedy by interstate compact should be exhausted before resort to a court of equity*

We agree with the Special Master in speaking of the selection of a water supply, where he says,

> "These questions are engineering and governmental and much fitter to be decided by the cities and towns concerned than by any court. But the questions are only suggestive and whoever passes on them will be taken still farther afield."
>
> (Report of Special Master, p. 50.)

This is the type of controversy which should be settled by interstate compact. This controversy involves the utilization of the resources of the Connecticut River for water supply, navigation, agricultural purposes, power, recreation, and so

forth. The conditions which are most favorable for one use may be entirely different for another. The record shows that the agricultural interests are interested primarily in any reduction in flood heights; on the other hand, from the standpoint of pollution, the State of Connecticut is interested, not only in the floods which flush out the stream, but also in the low flows which are necessary for the dilution of the sewage and the industrial waste burden which comes into the stream; navigation, of course, is primarily interested in the maintenance of the lower flows and in seeing that they are not disturbed; and the same is more or less true of the power interests and of the fishing industry along the river. The policy of the State of Connecticut in regard to the use of its water resources, the policy of the Commonwealth of Massachusetts in regard to the use of its water resources, and of the federal government, in its trusteeship of the navigable capacity and the navigability of the streams,—are all matters of vital concern; and a method has been provided for the handling of this question as a purely legislative function.

*Constitutional provisions.*

*Article I, Section 10, of the Constitution of the United States*, provides:

> "No state shall, without the consent of Congress, .... enter into any agreement or compact with another state ...."

It is significant that this provision of the Constitution appears under the heading of the legislative powers of the government of the United States. It is part and parcel of the *first provision of Article I*, which provides:

> "All *legislative powers herein granted* shall be vested in a Congress of the United States, which shall consist of a Senate and House of Representatives." (Italics are ours.)

So that one of the legislative powers granted by the states in Article I is the right to participate in and have the final approval as to any compacts or agreements entered into by the States.

*What governmental rights are subject to compact*

In the case of *Kansas v. Colorado*, 206 U. S., 46, in discussing the rights of the states, this Court said:

> "It may determine for itself whether the common law rule in respect to riparian rights or that doctrine which obtains in the arid regions of the west, of the appropriation of the waters for purposes of irrigation, shall control. Congress cannot enforce either rule upon any state."

And again, in the same case, when it was urged that some sort of compensatory water or benefit be furnished by the State of Colorado to the State of Kansas, this Court said:

> "That would be equivalent to this court's making a contract between two states, and that it is not authorized to do."

In the case of *Louisiana v. Texas*, 176 U. S., 1, 17, which was cited at some length in the case of *Missouri v. Illinois*, 180 U. S., 208; 200 U. S., 496, this Court said:

> "Controversies between them arising out of public relations and intercourse cannot be settled either by war or diplomacy, though, with the consent of Congress, they may be composed by agreement."

*The making of a compact is a legislative act and not a judicial act*

The quotations from the decisions of the Supreme Court follow the set up of the national Constitution. They recognize that subjects of compact which have to do with the property

rights of the several states are matters which can only be decided, and best be decided, by the legislative acts of the two states involved.

In *New York v. New Jersey and the Passaic Valley Sewage Commissioners,* 256 U. S., 296, this Court suggested, in dismissing the complaint of the State of New York (page 313):

> "We cannot withhold the suggestion, inspired by the consideration of this case, that the grave problem of sewage disposal presented by the large and growing population living on the shores of New York bay is one more likely to be wisely solved by co-operative study and by conference and mutual concession on the part of representatives of the states so vitally interested in it, than by proceedings in any court, however constituted."

*Control of the United States over terms of compact*

The consent of the United States to agreements or compacts among the several states relating to interstate waters is of necessity limited to such interests as the United States has under the Constitution. When a navigable stream is affected or may be affected, or the navigable capacity of a stream is affected or may be affected, the interests of the United States attach, and the authority of Congress must be obtained to make the compact or agreement a valid one.

*Policy as to compacts concerning water rights*

The control of the waters of interstate streams by the states through which the stream flows has been recognized by Congress in a number of acts which have been passed relating to this subject. These acts have all recognized that the disposition or the allocation of the waters of interstate streams should be determined in the first instance by the legislatures of the states involved; and under our constitutional provisions any agreements or compacts entered into by the states must

be ratified and approved by the Congress of the United States. The following are some of the acts which have been passed by Congress, either authorizing interstate compacts concerning this subject matter or approving compacts already made.

Act of August 8, 1917 (40 Stat., 266, sec. 5). Minnesota and North and South Dakota authorized to make agreements for the improvements of navigation and control of floods on boundary waters and tributaries.

Act of April 8, 1918 (40 Stat., 515). Oregon and Washington, protection of fishing in the Columbia River, etc. (Agreement ratified.)

Act of July 11, 1919 (41 Stat., 158). New York and New Jersey, construction of tunnel under Hudson River; consent to agreements authorized by New Jersey and New York.

Joint Resolution of March 4, 1921 (41 Stat., 1447). North and South Dakota, Minnesota, Wisconsin, Iowa and Nebraska; jurisdiction over boundary waters; agreements authorized.

Act of August 19, 1921 (42 Stat., 171). Arizona, California, Colorado, Nevada, New Mexico, Utah and Wyoming; apportionment of waters of Colorado River and its tributaries, agreement to be made by January 1, 1923, subject to approval by legislature of each state concerned, and by Congress.

Joint Resolution of September 22, 1922 (42 Stat., 1058). Kansas and Missouri, development of water works plans for Kansas City, Kans., and Kansas City, Missouri; agreement approved.

Act of January 29, 1925 (43 Stat., 796-798). Colorado and New Mexico; distribution of waters of LaPlatte River, compact approved.

Act of March 4, 1925 (43 Stat., 1268). Washington, Idaho, Oregon and Montana; apportionment of water supply of Columbia River and its tributaries; agreement to be made by January 1, 1927, subject to approval by legislature of each State and by Congress.

Act of March 8, 1926 (44 Stat., 195). Colorado and Nebraska; apportionment of waters of South Platte River; agreement approved.

Act of April 13, 1926 (44 Stat., 247, C. 129). Extension of time for agreement by Washington, Idaho, Oregon and Montana, under Act of March 4, 1925, to December 1, 1927.

Act of July 3, 1926 (44 Stat., 831, C. 754). Idaho, Wyoming, Washington and Oregon; apportionment of waters of Snake River; agreement authorized, subject to ratification by Congress.

Act of February 26, 1927 (44 Stat., 1247, C. 216). South Dakota and Wyoming; apportionment of waters of Belle Fourche and Cheyenne Rivers; agreement authorized by ratification of Congress.

Joint Resolution, March 3, 1927 (44 Stat., 1403, C. 382). Provisions of Act of March 4, 1925, Washington, Idaho, Oregon and Montana, as to apportionment of water supply of Columbia River and its tributaries extended to December 31, 1930.

Act of March 2, 1929 (45 Stat., 1502, C. 520). An Act granting the consent of Congress to compacts or agreements between the states of Colorado and New Mexico with respect to the division and apportionment of the waters of the Rio Grande, San Juan, Las Animas Rivers and other streams in which such states are jointly interested.

Act of March 2, 1929 (45 Stat., 1502, C. 521). Granting the consent of Congress to compacts and agreements between the States of New Mexico, Okla-

homa and Texas with respect to the division and apportionment of the waters of the Rio Grande, Picos and the Canadian or Red Rivers, and all other streams in which such States are jointly interested.

Act of March 2, 1929 (45 Stat., 1503, C. 522). Apportionment of the waters of the Cimarron River and all other streams in which the States of New Mexico and Oklahoma are jointly interested.

Act of March 2, 1929 (45 Stat., 1517, C. 538). An Act granting the consent of Congress to compacts or agreements between the States of Colorado, Oklahoma and Kansas with respect to the division and apportionment of the waters of the Arkansas River, and all other streams in which such States are interested.

*Sovereign must consent to taking*

Sovereign rights can only be divested by the voluntary act of the sovereign. This may be accomplished in a number of different ways under our form of government. So far as powers have been delegated to the United States, such rights as are necessary to carry into effect such powers have been transferred to the United States by the States. The ratification of the constitution effected the transfer. It was the voluntary act of the sovereign power of each State. Such act was that of the legislative branch of the government. It is the legislative branch which today must approve of all amendments to the Constitution which may seek to delegate further powers to the federal government.

The legislature of a state may also by appropriate action enter into agreement or compact with another state. But this agreement or compact must be approved by the legislatures of the states involved and by the legislative branch of the United States government. In no case is there any intimation that any department other than the legislative can so act.

Nowhere does it appear that the State of Connecticut has ever consented to the taking of any of the waters involved in this action.

In *Hudson Water Company v. McCarter*, 209 U. S., 349, it was said:

> "But is it recognized that the state, as quasi-sovereign and representative of the interests of the public has a standing in court to protect the atmosphere and the water and the forests within its territory, irrespective of the assent or dissent of the private owners of the land most immediately concerned."

And further—

> "It finds itself in possession of what all admit to be a great public good; and what it has it may keep and give no one a reason for its will."

In *Georgia v. Tennessee Copper Co.*, 206 U. S. 230, 237, 238, this Court said:

> "This is a suit by a state for an injury to it in its capacity of quasi-sovereign. In that capacity the state has an interest independent of and behind the titles of its citizens, in all the earth and air within its domain. It has the last word as to whether its mountains shall be stripped of their forests and its inhabitants shall breathe pure air. It might have to pay individuals before it could utter that word, but with it remains the final power . . . . Some peculiarities necessarily mark a suit of this kind. If the state has a case at all, it is somewhat more certainly entitled to specific relief than a private party might be. It is not lightly to be required to give up quasi-sovereign rights for pay, and, apart from the difficulty of valuing such rights in money, if that be its choice, it may insist that an infraction of them shall be stopped. The states, by entering the union, did not sink to the position of private owners subject to one system of private law.

> This court has not quite the same freedom to balance the harm that will be done by an injunction against that of which the plaintiff complains that it would have in deciding between two subjects of a single political power. Without excluding the considerations that equity always takes into account, we cannot give the weight that was given them in argument to a comparison between the damage threatened to the plaintiff and the calamity of a possible stop to the defendant's business, the question of health, the character of the forests as a first or second growth, the commercial possibility or impossibility of reducing the fumes to sulphuric acid, the special adaptation of the business to the place . . . . . If any such demand is to be enforced this must be, notwithstanding the hesitation that we might feel if the suit were between private parties, and the doubt whether, for the injuries which they might be suffering to their property, they should not be left to an action at law."

We think it proper to state here that as a result of this decision the defendant company applied modern science to its business and perfected a workable and satisfactory plan. In this case, the action of this Court in granting the injunction stimulated the necessity which is "the mother of invention." The defendant did what we claim Massachusetts should now do, employ the scientific methods which are available.

## XIV CONCLUSION

It is respectfully contended that the Complainant has shown that the proposed diversion of water from the Ware and Swift Rivers, as provided in the Massachusetts legislation, existing when this action was instituted, is of sufficient importance to cause the War Department to restrict the taking of these waters in the interests of navigation.

This proposed taking is of equal importance to other interests represented by the State of Connecticut, in its own

right as a riparian owner on the Connecticut River, as trustee for the public in maintaining the use of the waters of the River for navigation and fishing, as *parens patriae*, representing the general welfare of its people and in the interests of their health and comfort as well as its interests as a sovereign desiring to protect and conserve its natural resources.

It is conceded by the Special Master that damage will be inflicted by the proposed diversions as to both power and agriculture and we believe that our injury is not limited to these two factors but extends to navigation and fish life.

We believe that there is a decided distinction between injury and damage. This is not a claim for damages but a bill to enjoin the infraction of a property right. This property right has been recognized in both Connecticut and Massachusetts since their formation and should not be lightly discarded.

The claim of the Commonwealth of Massachusetts is that a great and serious emergency and necessity has arisen which is of sufficient gravity to justify its conduct in permanently removing water from the flow of an interstate stream in such manner and in such quantities as to destroy the plaintiff's right to the water and prevent it from having a like use of the same. Certainly such a claim warrants careful consideration and should demand that the necessity and emergency should be of "serious magnitude" and should be established "by clear and convincing evidence" by the State advancing it.

We confidently feel that this burden has not been sustained. Instead of the absolute lack of available supplies and the opportunity of a comprehensive development, a definite plan for a water supply development which will furnish as much water as can be developed on the Ware and Swift Rivers has been submitted by the designing engineer of the Metro-

politan Water Supply Commission. This confirms the many reports of the country's best engineers during the past half century and the independent investigations of the complainant's experts.

Under these circumstances the Complainant claims that the time has not yet arrived, nor have the conditions warranting such change in policy and law been shown to exist, and until they do, the two states should be left in *statu quo* and the injunction prayed for granted.

Respectfully submitted,

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